

**United States Department of the Interior
Bureau of Land Management
Royal Gorge Field Office
3028 E. Main Street
Cañon City, CO 81212**

Environmental Assessment

Grant Salisbury and File APDs

DOI-BLM-CO-F02-2014-16 EA

January, 2014



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CHAPTER 1 - INTRODUCTION

1.1 IDENTIFYING INFORMATION

CASEFILE/PROJECT NUMBER (optional): Lease # COC 53941 and COC 30024

PROJECT TITLE: Grant Salisbury and File Applications for Permits to Drill

PLANNING UNIT: Northeast

LEGAL DESCRIPTION: Weld County, T2N R68W S 14 and 32

APPLICANT: Encana Oil and Gas

1.2 INTRODUCTION AND BACKGROUND

The BLM has received 7 Applications for Permits to Drill (APDs), proposing the construction of two well pads, with access roads and the drilling of 7 horizontal oil and gas wells on private surface over private minerals, developing both private and federal minerals (fee/fee/fed). 4 of the 7 proposed fee/fee/fed wells are planned for the “Grant Salisbury” pad, and the remaining 3 fee/fee/fed wells are planned for the “File” pad. The operator is planning on drilling several totally fee (private) wells on both pads, regardless of the BLMs decision to approve or deny the fee/fee/fed APDs. These fee wells will require an approved APD through COGCC (the Colorado State regulatory authority for Fee and State wells), and will not require a BLM APD since they will not penetrate federal mineral estate. Since all surface activity and related disturbance is taking place off lease on private surface over private minerals, and private minerals are targeted along with federal minerals, BLM has limited authority over the actions that take place on the surface, including authority to impose mitigation measures (as COAs to the approved APD) pertaining to the surface management of the well site. However, BLM will analyze the impacts to applicable resources, including some that BLM has no authority to affect.

The projects are in Weld County, approximately 6 miles southeast of Longmont. The federal mineral estate is leased and subject to oil and gas development.

The general area description would be defined as cultivated, irrigated cropland located near the I-25 corridor, North of the Denver-Metro area, in the Wattenberg Field. Much of this area is used for livestock and crop production and oil and gas development. There are highways and county roads near the project area. Access to the pads is limited to private or petroleum field roads, over private surface. There are no public lands, or public access to the project.

Extensive oil and gas development has occurred in the area, mostly on private (fee) surface and private (fee) mineral estate.

1.3 PURPOSE AND NEED

The purpose of the action is to provide the applicant the opportunity to develop their leases for the production of oil and gas. The need for the action is to develop oil and gas resources on Federal Lease COC53941 and COC 30024 consistent with existing Federal lease rights provided for in the Mineral Leasing Act of 1920, as amended.

1.4 DECISION TO BE MADE

The BLM will decide whether to approve the 7 proposed Grant Salisbury and File Applications for Permits to Drill (APDs) project based on the analysis contained in this Environmental Assessment (EA). This EA will analyze the proposed action; to construct 2 well pads with access roads, install production facilities, and drill wells in order to develop federal and private minerals from a private surface. Access to the proposed project would be on existing highway, county and oil field roads. The finding associated with this EA may not constitute the final approval for the individual APDs.

1.5 PLAN CONFORMANCE REVIEW

PLAN CONFORMANCE REVIEW: The Proposed Action is subject to and has been reviewed for conformance with the following plan (43 CFR 1610.5, BLM 1617.3):

Name of Plan: Northeast Resource Area Plan and Record of Decision as amended by the Colorado Oil and Gas Final EIS and Record of Decision (RD)

Date Approved: 09/16/86 amended 12/06/91

Decision Number: O&G Resources, Issue 21

Decision Language: “These 210,410 acres of surface and subsurface may be leased and developed for oil and gas with the standard stipulations included in the leases and standard site-specific stipulations included in any use authorization.”

1.6 SCOPING, PUBLIC INVOLVEMENT AND ISSUES

1.6.1 Scoping: NEPA regulations (40 CFR §1500-1508) require that the BLM use a scoping process to identify potential significant issues in preparation for impact analysis. The principal goals of scoping are to allow public participation to identify issues, concerns, and potential impacts that require detailed analysis.

Persons/Public/Agencies Consulted: The federal mineral estate parcels being accessed with this action were scoped and made available for public comment during the leasing process. Scoping for the current action occurred through posting on the BLM NEPA website.

Issues Identified:

No issues were identified during public scoping.

CHAPTER 2 - PROPOSED ACTION AND ALTERNATIVES

2.1 ALTERNATIVES ANALYZED IN DETAIL

2.1.1 Proposed Action

The proposed action is to construct 2 well pads with access roads, and drill 7 horizontal wells to develop private and federal minerals, from a private surface over private minerals.

Access to the proposed projects would be gained by traveling on existing highways, county and oil field roads.

Proposed Pad Details:

Grant Salisbury Pad:

Four fee/fee/fed horizontal wells are planned to be drilled from the surface of the Grant Salisbury pad, along with planned fee wells. A short section of the production zone of the fee/fee/fed bores will pass through a small parcel of federal minerals, located under a United States armory facility north of the pad. The majority of the production zone of the fee/fee/fed wellbores will be in fee minerals.

The proposed Grant Salisbury well pad would share the access to an existing adjacent fee well pad. This existing route will be slightly modified from its current configuration to provide a more direct route to the existing and proposed well locations from Weld County Road 22. The new portion of the road to be constructed will be approximately 850 feet in length. The road will be 15 feet wide, surfaced with gravel roadbase, and graded to allow water runoff. Culvert(s) will be installed where necessary. The long term disturbance associated with the road would be less than .5 acres. The maximum road grade is less than 3% and there are no major cuts or fills required.

The proposed Grant Salisbury I pad would have a maximum cut of 4 feet and a maximum fill of 3 feet, which will balance (no spoils stockpile), leaving 4833 cu yards of topsoil which will be stripped from the top 6" of the surface and stockpiled before construction, for use during interim reclamation. Construction of the well pad would result in approximately 6 acres of new surface disturbance, which would be reduced to 3.25 acres after successful interim reclamation.

The proposed pad is located in a cornfield.

File Pad:

Three fee/fee/fed horizontal wells are planned to be drilled from the surface of the File pad, along with planned fee wells. A portion of the production zone of the wellbores of the fee/fee/fed wells will pass through federal minerals, but the majority of the production zones of the wellbores will be in fee minerals.

Rig access and long term access to the File pad would be through a newly constructed road. The operator is planning on abandoning and reclaiming the existing road which is in place for the existing pad located adjacent to the proposed File pad. The new road will be approximately 2,270 feet in length, with a 15 foot width surfaced with gravel roadbase, and graded to allow water runoff. Culvert(s) will be installed where necessary. The long term disturbance associated with the road will be approximately .75 acres.

The proposed File pad finished elevation is 12 feet higher than the existing location at the well stakes. To achieve this, approximately 143,147 cu yards of fill will be brought in. This will result in a maximum of 19.5 feet of fill at the naturally lowest point, which is the NW corner of the pad. Prior to hauling in the fill, the top 6" of topsoil will be stripped and stockpiled for use during interim reclamation. Construction of the well pad would result in approximately 11.5 acres of new surface disturbance, which would be reduced to 5.5 acres after successful interim reclamation.

An area directly north of the pad will be temporarily utilized to place large volume portable water tanks for completion of the well. This area is four acres in size. Any disturbance that takes place within this area will be reclaimed.

The proposed pad is located within an irrigated alfalfa field.

The proposed drilling and completion of all wells will utilize closed loop systems, no pits will be utilized. All waste materials generated during construction, drilling, completion, and production such as drill cuttings, completion fluids, produced water, sewage and garbage, will be hauled off site and recycled or disposed of at applicable state permitted commercial treatment/disposal facilities. All waste materials associated with this project will be recycled/remediated/disposed of in accordance with all State and Federal laws. The duration of drilling activities is estimated to be approximately 2 weeks per well.

Interim reclamation of each pad will begin within 6 months (weather permitting) of completion of final well. Interim reclamation will consist of redistribution of excess soil, re-contouring the areas of the pad not needed for production as close to original as possible. All areas not needed for transportation of produced liquids and routine maintenance would be re-vegetated in accordance with the wishes of the surface owners, and the surface use agreements between the surface owners and the operators. The surfaces of these projects are used for cultivation of crops.

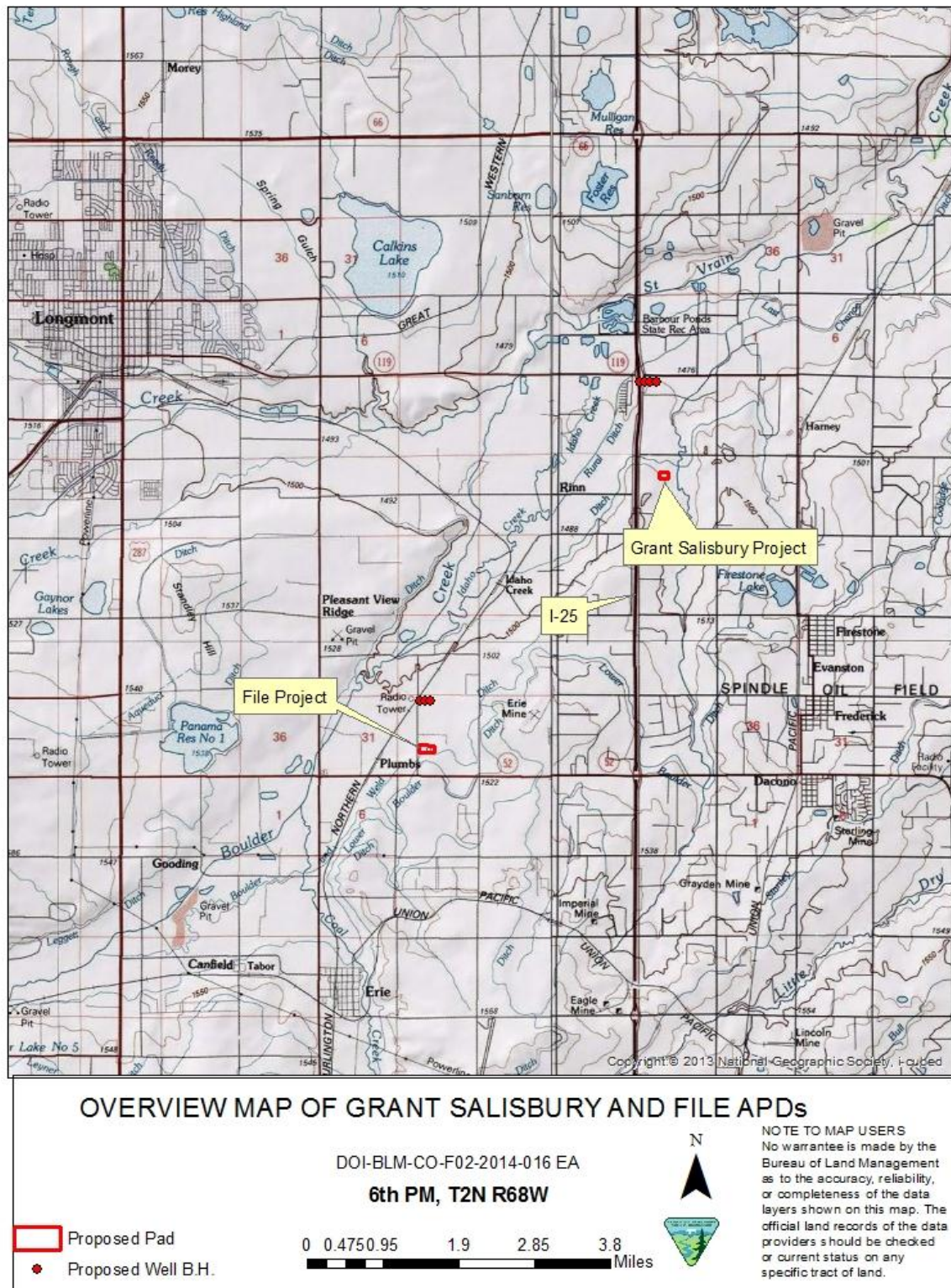
Final reclamation of each project will begin within 6 months (weather permitting) of final well plugging, or in the event of a dry hole. Final abandonment will be completed in accordance with approved APD, which consists of proper plugging of wells, removal of all facilities and related

equipment from the surface of the site. Top soil will be stripped and segregated so it can be spread evenly over the entire area. Because the projects are taking place in active, private irrigated cropland, the reclamation activities of the operator will be in accordance with the wishes of the surface owners. This is covered in the Surface Use Agreement in place between operator and surfaces owners

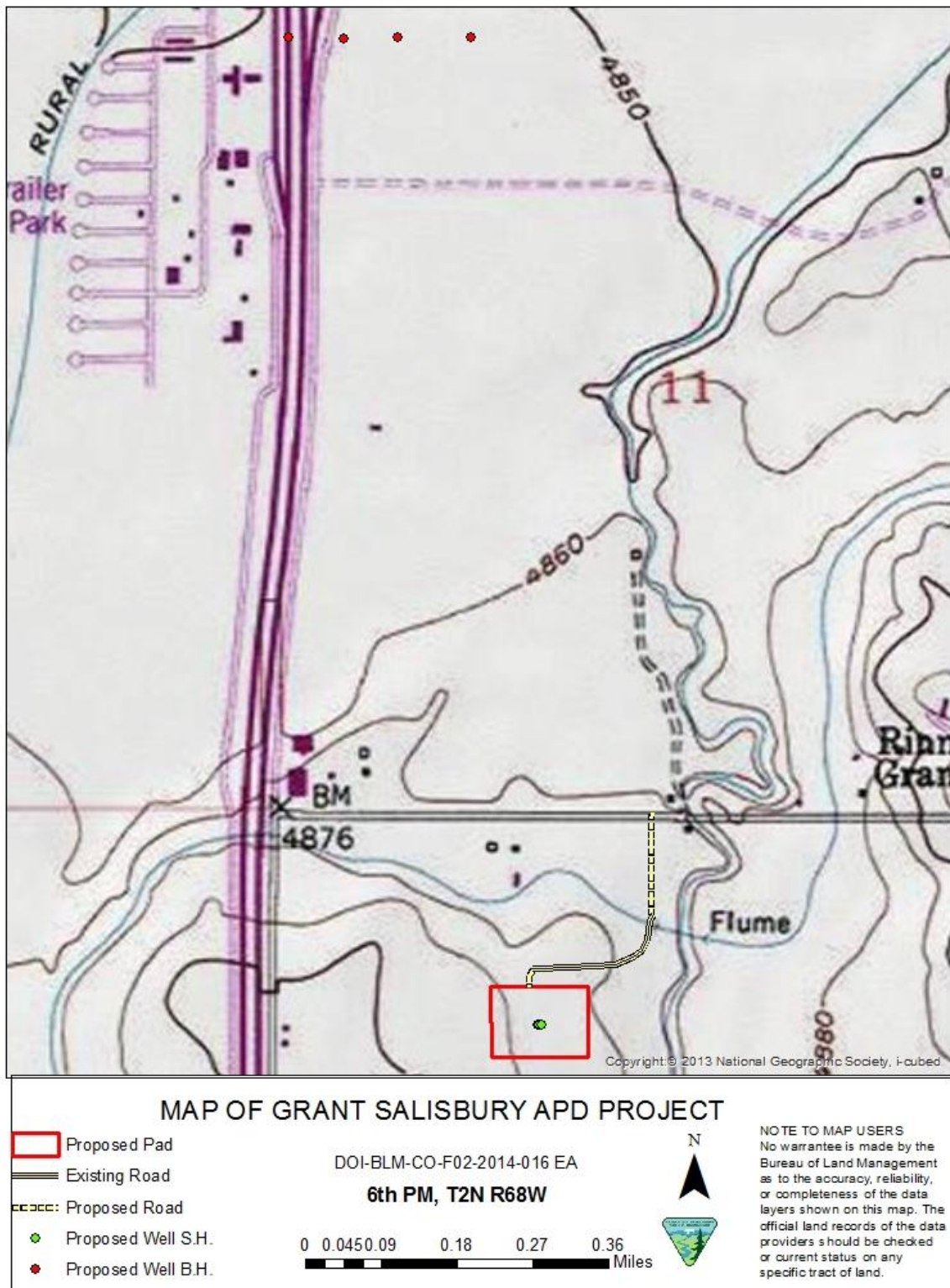
During the life of the project, the area will be monitored for presence of weeds, which will be controlled by a licensed applicator if present.

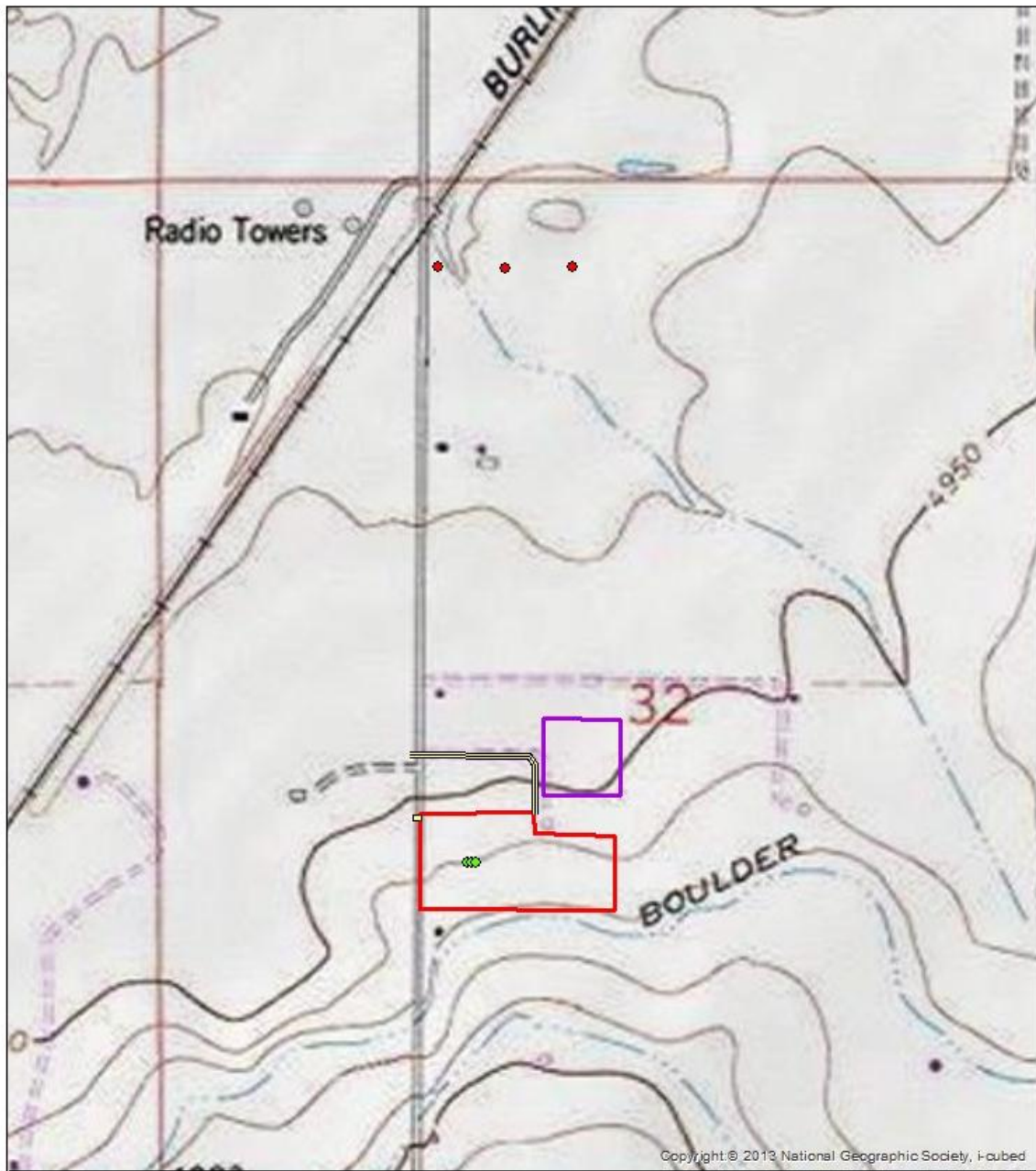
The Application for Permit to Drill (APD) for each new well includes a detailed and specific drilling program and multi-point surface operations plan (including detailed construction and reclamation plans.) The proposed action would be implemented consistent with the operations plans provided with approved permit, with Conditions Of Approval (COAs), Onshore Oil and Gas Orders, the applicable terms of Federal Leases COC 53941 and COC 30024, Onshore Oil and Gas Orders, and 43 CFR §3100.

Overview Map



Topographic Project Maps





- Proposed Pad
- Temp Watertank Staging Area
- Existing Road
- Proposed Road
- Proposed Well S.H.
- Proposed Well B.H.

MAP OF FILE APD PROJECT

DOI-BLM-CO-F02-2014-016 EA

6th PM, T2N R68W

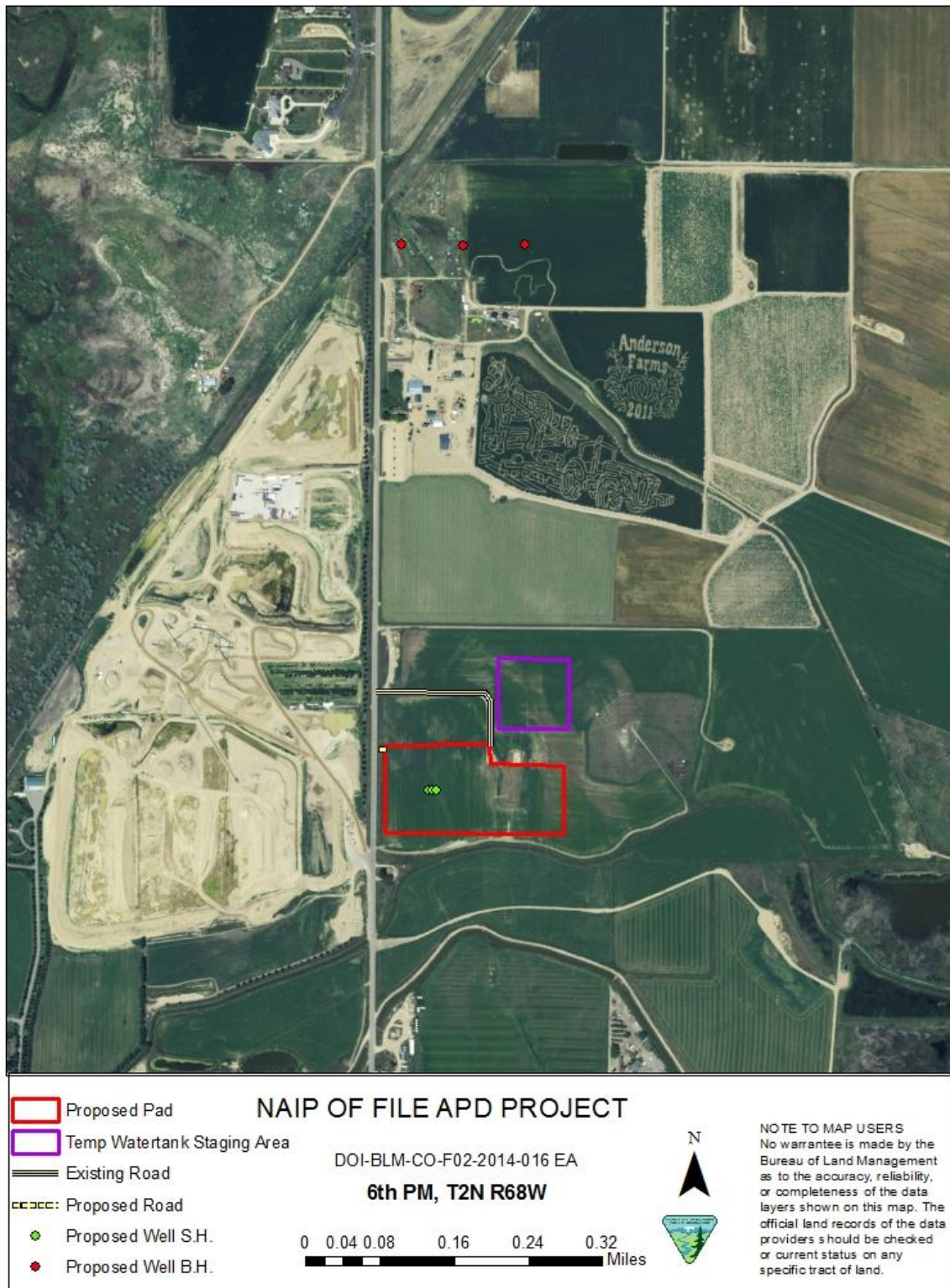
0 0.04 0.08 0.16 0.24 0.32 Miles



NOTE TO MAP USERS
No warrantee is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of the data layers shown on this map. The official land records of the data providers should be checked or current status on any specific tract of land.

Aerial Photos of Projects





2.1.2 No Action Alternative

The proposed action involves Federal subsurface minerals that are encumbered with Federal oil and gas leases, which grant the lessee a right to explore and develop the leases. Although BLM cannot deny the right to drill and develop the leasehold, individual APDs can be denied to prevent unnecessary and undue degradation. The no action alternative constitutes denial of the APDs associated with the proposed action. Under the no action alternative, the fee/fee/fed wells could not develop the federal minerals, but they may still be drilled into the fee minerals, and the fee wells planned for the pad may still be drilled, and actions associated with the drilling of the planned fee wells (pad and road construction) would likely still take place.

2.3 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL

Other alternatives were not considered due to the proposed project being a non-discretionary action being proposed on private surface.

CHAPTER 3 - AFFECTED ENVIRONMENT AND EFFECTS

3.1 INTRODUCTION

This section provides a description of the human and natural environmental resources that could be affected by the Proposed Action and presents comparative analyses of the direct, indirect and cumulative effects on the affected environment stemming from the implementation of the actions under the Proposed Action and other alternatives analyzed.

3.1.1 Interdisciplinary Team Review

The following table is provided as a mechanism for resource staff review, to identify those resource values with issues or potential impacts from the proposed action and/or alternatives. Those resources identified in the table as potentially impacted will be brought forward for analysis.

<u>Resource</u>	<u>Initial and date</u>	<u>Comment or Reason for Dismissal from Analysis</u>
<u>Air Quality</u> <i>Ty Webb, Chad Meister, Melissa Hovey</i>	FC, 2/24/14	See affected environment
<u>Geology/Minerals</u> <i>Stephanie Carter, Melissa Smeins</i>	MJS, 2/24/2014	See affected environment
<u>Soils</u> <i>John Smeins</i>	JS, 1/23/14	All infrastructure (roads, drill pads, etc.) being proposed, are located in cultivated agriculture fields and would be built and reclaimed according to BLM Gold Book standards unless otherwise stipulated by the surface owner.
<u>Water Quality</u> <u>Surface and Ground</u> <i>John Smeins</i>	JS, 1/23/14	See Water Quality section.

<u>Resource</u>	<u>Initial and date</u>	<u>Comment or Reason for Dismissal from Analysis</u>
<u>Invasive Plants</u> <i>John Lamman</i>	JL, 02/03/2014	See affected environment.
<u>T&E and Sensitive Species</u> <i>Matt Rustand</i>	MR, 1/22/2014	See affected environment.
<u>Vegetation</u> <i>Jeff Williams, Chris Cloninger, John Lamman</i>	JL, 02/03/2014	See affected environment
<u>Wetlands and Riparian</u> <i>Dave Gilbert</i>	DG, 02/13/14	The Proposed Action is entirely within upland habitat of cultivated cropland. There is no direct overlap with wetland or riparian resources.
<u>Wildlife Aquatic</u> <i>Dave Gilbert</i>	DG, 02/13/14	The Proposed Action is entirely within upland habitat within cultivated cropland. There is no direct overlap with aquatic habitat.
<u>Wildlife Terrestrial</u> <i>Matt Rustand</i>	MR, 1/22/2014	See affected environment
<u>Migratory Birds</u> <i>Matt Rustand</i>	MR, 1/22/2014	See affected environment.
<u>Cultural Resources</u> <i>Monica Weimer</i>	MMW, 2/26/14	Both historic and prehistoric sites are present in the vicinity of the areas of potential effect [see Reports CR-RG-14-70 (P) and CR-RG-14-90 (P)]. Although four historic properties were found (5WL3146.3, 5WL3146.4, 5WL3146.5, and 5WL5461.2), the undertakings were redesigned to avoid the sites, and there will be no adverse effect on them.
<u>Native American Religious Concerns</u> <i>Monica Weimer</i>	MMW, 2/26/14	Although aboriginal sites are present in Weld County, there are no identified properties of traditional religious or cultural significance in the APE. The cultural resources inventories of the APEs produced no other evidence that suggests the APE holds special significance for Native Americans. The BLM conducted a consultation with the following tribes: Apache Tribe of Oklahoma, Cheyenne and Arapaho Tribes of Oklahoma, Cheyenne River Sioux Tribe, Comanche Tribe of Oklahoma, Crow Creek Sioux, Eastern Shoshone, Jicarilla Apache Nation, Kiowa Tribe of Oklahoma, Northern Arapaho Tribe, Northern Cheyenne Tribe, the Ute Tribe, Oglala Sioux Tribe, Pawnee Tribe, Rosebud Sioux Tribe, Southern Ute Tribe, Standing Rock Lakota Tribe, and the Ute Mountain Ute Tribe.
<u>Economics</u> <i>Dave Epstein, Martin Weimer</i>	AR, 1/14/13	See affected environment
<u>Paleontology</u> <i>Melissa Smeins, Stephanie Carter</i>	MJS, 2/24/2014	See affected environment
<u>Visual Resources</u> <i>Kalem Lenard</i>	KL, 1/30/2014	The project is within a highly modified environment with existing structures and wells and would not impact visual resources.
<u>Environmental Justice</u> <i>Martin Weimer</i>	mw, 1/31/14	The proposed action affects areas that are rural in nature. The land adjacent to the well site is commercial and cultivated land, as a result, there are no minority or low-income populations in or near the project area. As such, the proposal will not have a disproportionately high or adverse environmental

<u>Resource</u>	<u>Initial and date</u>	<u>Comment or Reason for Dismissal from Analysis</u>
		effect on minority or low-income populations.
<u>Wastes Hazardous or Solid</u> <i>Stephanie Carter</i>	MJS, 2/24/2014	See affected environment
<u>Recreation</u> <i>Kalem Lenard</i>	KL, 1/30/2014	Not Present
<u>Farmlands Prime and Unique</u> <i>John Smeins</i>	JS, 01/23/2013	All disturbances on the File pad and a portion of the disturbance on the Grant pad would take place on soils classified as Prime Farmland when irrigated. These soils are currently irrigated; therefore, Prime Farmlands would be impacted. Refer to the Soils section.
<u>Lands and Realty</u> <i>Steve Craddock</i>		N/A
<u>Wilderness, WSAs, ACECs, Wild & Scenic Rivers</u> <i>Kalem Lenard</i>	KL, 1/30/2014	Not Present
<u>Wilderness Characteristics</u> <i>Kalem Lenard</i>	KL, 1/30/2014	Not Present
<u>Range Management</u> <i>Jeff Williams, Chris Cloninger, John Lamman</i>	JL, 02/03/2014	Surface estate is private
<u>Forest Management</u> <i>Ken Reed</i>	KR, 1/21/14	Not Present
<u>Cadastral Survey</u> <i>Jeff Covington</i>	JC, 2/26/14	COS is attached in the project folder.
<u>Noise</u> <i>Martin Weimer</i>	mw, 3/11/14	The project area is located in a high plains environment, currently used for commercial and farming purposes. Certain levels of noise are associated with drilling operations, these include drill rig operation, compressors/generators and general machine and vehicle operation. These impacts are temporary and terminate when drilling operations are complete.
<u>Fire</u> <i>Bob Hurley</i>		N/A
<u>Law Enforcement</u> <i>Steve Cunningham</i>		N/A

The affected resources brought forward for analysis include:

- Air quality
- Geology/Minerals

- Water Quality
- Soils
- Invasive Plants
- Vegetation
- Wildlife Terrestrial
- Migratory Birds
- Paleontology
- Wastes Hazardous or Solid

3.2 PHYSICAL RESOURCES

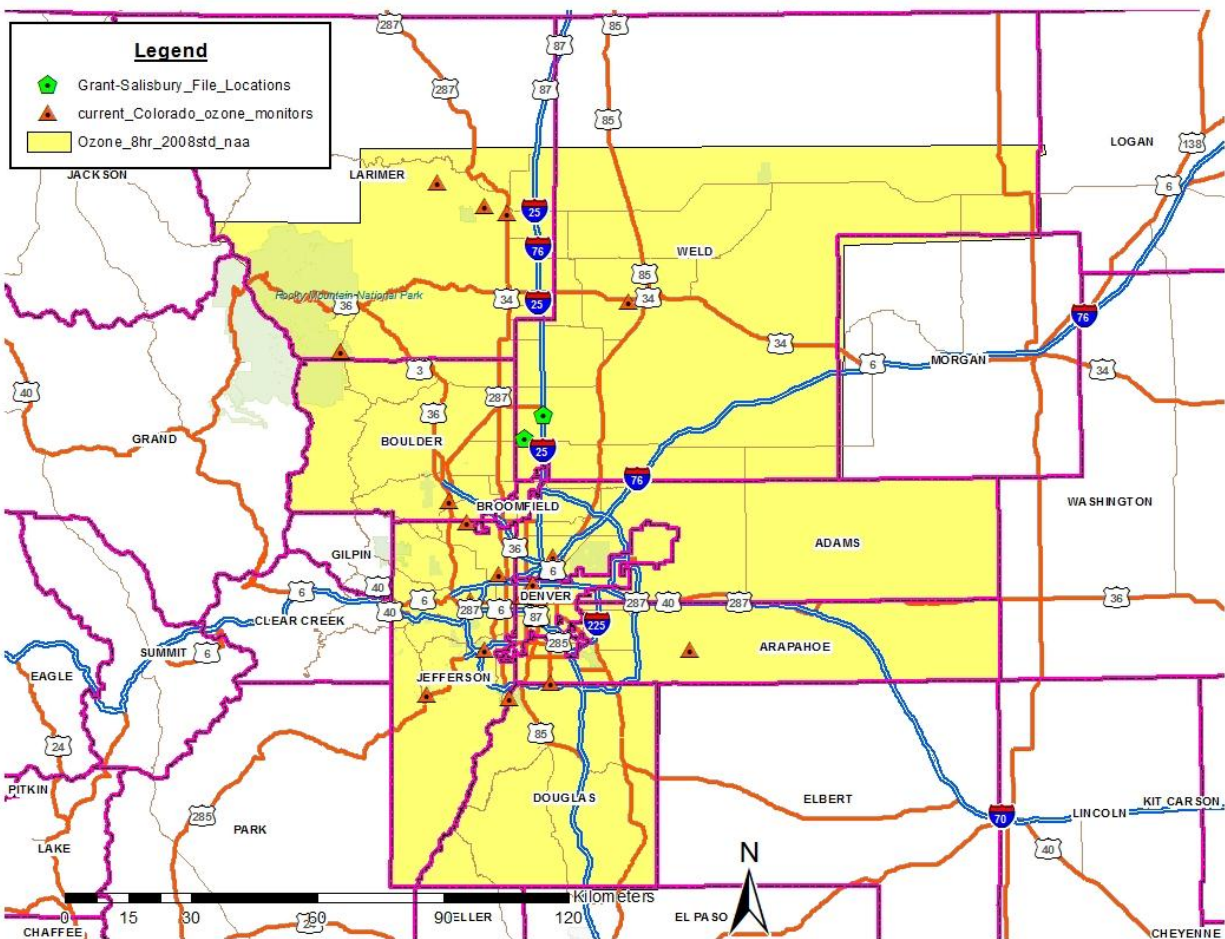
3.2.1 AIR QUALITY AND CLIMATE

Affected Environment: The proposed action area (Northeastern Weld County) is predominantly used for agriculture. Approximately 75% of the available land area of Weld County is linked to the agricultural sector of the economy in one form or another. Oil and gas development is another major economic driver for the area, and Weld County has some 25,000 active wells within its boundaries.

The population density of Weld County is generally dispersed within the proposed action area, and is generally less than 100-250 people per square mile. Mean temperatures in the area range from 15.6 degrees F in January to 88.7 degrees F in July. The area receives average annual precipitation of approximately 14.22 inches. Frequent winds in the area provide excellent dispersion characteristics for distributing anthropogenic emissions.

Activities occurring within the area that affect air quality include exhaust emission from cars, drilling rigs, other vehicles, and oil and gas development activities, as well as fugitive dust from roads, agriculture, and energy development.

Figure 3-1. Project Location and Boundaries



Regulatory Framework: The Clean Air Act (CAA), which was last amended in 1990, requires the Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS) (40 CFR part 50) for criteria pollutants. Criteria pollutants are air contaminants that are commonly emitted from the majority of emissions sources and include carbon monoxide (CO), lead (Pb), sulfur dioxide (SO₂), particulate matter smaller than 10 & 2.5 microns (PM₁₀ & PM_{2.5}), ozone (O₃), and nitrogen dioxide (NO₂).

The CAA established 2 types of NAAQS:

Primary standards: – Primary standards set limits in order to protect public health, including the health of "sensitive" populations (such as asthmatics, children, and the elderly).

Secondary standards: – Secondary standards set limits in order to protect public welfare, including protection against decreased visibility, and damage to animals, crops, vegetation, and buildings.

The EPA regularly reviews the NAAQS (every five years) to ensure that the latest science on health effects, risk assessment, and observable data such as incidence rates are evaluated in order to re-propose any NAAQS to a lower limit if the data supports the finding. The Colorado Air Pollution Control Commission, by means of an approved State Implementation Plan (SIP) and/or delegation by EPA, can establish state ambient air quality standards for any criteria pollutant that is at least as stringent as, or more so, than the federal standards. Ambient air quality standards must not be exceeded in areas where the general public has access. Table 3.1 lists the federal and state ambient air quality standards.

Table 3-1. Ambient Air Quality Standards (EPA 2013)

Pollutant [final rule cite]		Primary/ Secondary	Averaging Time	Level	Form
Carbon Monoxide [76 FR 54294, Aug 31, 2011]		primary	8-hour	9 ppm	Not to be exceeded more than once per year
			1-hour	35 ppm	
Lead [73 FR 66964, Nov 12, 2008]		primary and secondary	Rolling 3 month average	0.15 µg/m ³	Not to be exceeded
Nitrogen Dioxide [75 FR 6474, Feb 9, 2010] [61 FR 52852, Oct 8, 1996]		primary	1-hour	100 ppb	98th percentile, averaged over 3 years
		primary and secondary	Annual	53 ppb	Annual Mean
Ozone [73 FR 16436, Mar 27, 2008]		primary and secondary	8-hour	0.075 ppm	Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years
Particle Pollution [Dec 14, 2012]	PM _{2.5}	primary	Annual	12 µg/m ³	Annual mean, averaged over 3 years
		secondary	Annual	15 µg/m ³	Annual mean, averaged over 3 years
		primary and secondary	24-hour	35 µg/m ³	98th percentile, averaged over 3 years
	PM ₁₀	primary and secondary	24-hour	150 µg/m ³	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide [75 FR 35520, Jun 22, 2010] [38 FR 25678, Sept 14, 1973]		primary	1-hour	75 ppb	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		secondary	3-hour	0.5 ppm	Not to be exceeded more than once per year

The nearest APCD air monitors to the project sites are the Weld County West Annex (CO), County Tower (O₃), and Hospital (PM₁₀ & PM_{2.5}) sites located in Greeley, and the Platteville Middle School site (PM_{2.5}).

Table 3-2. Ambient Air Quality Monitoring Data Trends (CDPHE 2007 – 2010, EPA Forms)

Monitor	Pollutant (Standard)	2007	2008	2009	2010
West Annex	CO (1 Hour - ppm)	4.0	5.0	4.3	2.3
	CO (8 Hour - ppm)	2.5	2.3	2.3	1.8
County Tower	O ₃ (8 Hour - ppm)	0.078	0.076	0.075	0.074
Hospital	PM ₁₀ (24 Hour - µg/m ³)	89	68	63.0	44.0
	PM _{2.5} (24 Hour - µg/m ³)	24.0	25.2	24.7	22.0
	PM _{2.5} (Annual - µg/m ³)	9.5	7.67	8.36	7.6
Platteville	PM _{2.5} (24 Hour - µg/m ³)	24.0	25.2	25.7	21.1
	PM _{2.5} (Annual - µg/m ³)	10.3	8.23	8.24	7.8

Table 3-3. Additional Ambient Background Concentrations

Pollutant / Units	Non-Particulate Matter Background Monitored Concentrations (Year 2012)			Monitoring Station Information
	1-Hour	1-Hour	1-Hour	
NO ₂ (µg/m ³)	9.97 ^a	67.37 ^b	120.44 ^c	a.Rio Blanco County 98 th percentile NO ₂ 1-hour. b.Cheyenne, Wyoming 98 th percentile NO ₂ 1-hour. c.North Denver, Colorado 98 th percentile NO ₂ 1-hour.
Pollutant / Units	Particulate Matter Background Monitored Concentrations (Year 2012)			Monitoring Station Information
	24-Hour	24-Hour	24-Hour	
PM ₁₀ (µg/m ³)	91 ^a	87 ^b	86 ^c	a.Greeley, Colorado 2 nd maximum 24-hour average PM ₁₀ concentration. b.Denver, Colorado 2 nd maximum 24-hour average PM ₁₀ concentration. c.North Denver, Colorado 2 nd maximum 24-hour average PM ₁₀ concentration.
PM _{2.5} (µg/m ³)	19 ^a	28 ^b	17 ^c	a.Denver, Colorado 98 th percentile 24-hour average PM _{2.5} concentration. b.Longmont, Colorado 98 th percentile 24-hour average PM _{2.5} concentration. c.Boulder, Colorado 98 th percentile 24-hour average PM _{2.5} concentration.

µg/m³ = micrograms per cubic meter

NO₂ = nitrogen dioxide

PM₁₀ / PM_{2.5} = particulate matter less than or equal to 10 microns / 2.5 microns in size

The USEPA has recently established a final rule of new source performance standards (NSPS) and emissions regulations for oil and gas facilities. The following Table 3-4 provides a summary of the NSPS OOOO oil and gas requirements.

Table 3-4. Summary of USEPA NSPS Oil and Gas Requirements

Source Affected by USEPA NSPS Requirements	Criteria Pollutants					GHG Pollutants			HAPs
Natural Gas Well Completion					VOC		CH ₄		HAPs
	NSPS Requirements for New Hydraulically Fractured Wells (2-Phased Approach): First phase (before Jan.1, 2015), industry must reduce emissions either by flaring using a completion combustion device or by capturing the gas using green completions. Second phase (beginning Jan. 1, 2015), operators must capture the gas and make it available for use or sale. Exceptions to the final rule apply for new exploratory wells, oil wells, low-pressure wells, and where combustion is a safety hazard or is prohibited by state or local regulations.								
Natural Gas Well Re-Completion					VOC		CH ₄		HAPs
	NSPS Requirements for Refractured Natural Gas Wells: Owners/operators of refractured gas wells may choose to reduce emissions through flaring until January 1, 2015, when the must use green completions.								
Pneumatic Controllers					VOC		CH ₄		HAPs
	NSPS Requirements for New and Modified Controllers: The final rule affects high-bleed, gas-driven controllers (with a gas bleed rate greater than 6 SCFH) that are located between the wellhead and the point where gas enters the transmissions pipeline. At the wellsite (also applies to oil well sites) and at gas gathering and boosting stations, the gas bleed limit is 6 CFH at an individual controller. Phase in over one year and exceptions apply for safety hazards and for applications that require high-bleed controllers. For gas processing plants, the VOC emissions limit is zero for continuous bleed, gas driven controllers.								
Storage Tanks					VOC		CH ₄		HAPs
	NSPS Requirements for Storage Vessels at the Well Site (also applies to oil well sites) and Gas Gathering and Boosting Stations and Natural Gas Processing Plants and Compressor Stations: New storage tanks with VOC emissions of 6 tons per year or more must reduce total VOC emissions by at least 95 percent. The final rule provides a one-year phase-in for this requirement.								
Glycol Dehydrators					VOC		CH ₄		HAPs

Source Affected by USEPA NSPS Requirements	Criteria Pollutants					GHG Pollutants			HAPs	
	Air Toxic Requirements for Glycol Dehydrators at the Well Site and Gas Gathering & Boosting Stations and Natural Gas Processing Plants and Natural Gas Compressor Stations: Large dehydrators – operators may reduce benzene emissions from large dehydrators to less than 1 ton per year as an alternative to reducing total air toxics emissions by 95 percent. Small dehydrators -Both existing and new small glycol dehydrators must meet a unit-specific limit for emissions of BTEX (benzene, toluene, ethylbenzene and xylene) that is based on the unit’s natural gas throughput and gas composition. The limit is determined by applying a formula set out in the final rule. New small dehyds must comply within 60 days and existing dehyds must comply within 3 years. This rule only applies to major sources of air toxics.									
Compressors						VOC		CH ₄		HAPs
	NSPS Requirements for New and Modified at Gas Gathering and Boosting Stations and Gas Processing Plants: Centrifugal compressors – the final rule requires a 95 percent reduction in VOC emissions from compressor with wet seal systems, controlling the gas that gets absorbed in the wet seals oil. Reciprocating compressors – final rule requires the replacement of rod packing systems, and replacement is required every 26,000 hours of operation or every 36 months or 6 tons per year or more must reduce total VOC emissions by at least 95 percent. The final rule provides a one-year phase-in for this requirement.									
Sweetening Units					SO ₂					
	NSPS SO ₂ Requirement for New and Modified Sweetening Units: The final rule requires sweetening units at natural gas processing plants to reduce SO ₂ emissions by 99.9 percent. This requirement applies to units with a sulfur production rate of at least 5 long tons per year.									
Leak Detection and Repair						VOC		CH ₄		HAPs
	The final rule states that the compliance date for new sources for leak detection and repair requirements is 60 days after the final rule is published and existing sources covered by the air toxics rule have an additional year to comply.									

The CAA and the Federal Land Policy and Management Act of 1976 (FLPMA) require BLM and other federal agencies to ensure actions taken by the agency comply with federal, state, tribal, and local air quality standards and regulations. FLPMA further directs the Secretary of the Interior to take any action necessary to prevent unnecessary or undue degradation of the lands [Section 302 (b)], and to manage the public lands “in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values” [Section 102 (a)(8)].

The BLM, as the federal entity with jurisdiction for the subject activity, is bound by the requirements of the General Conformity rule under section 176(c) of the Clean Air Act for

authorizing activities within a designated nonattainment or maintenance air quality area/region. The subject activity will be located within the Denver-metropolitan and North Front Range Ozone Nonattainment Area (Marginal), and thus a positive General Conformity demonstration or non-applicability analysis is required before the BLM can authorize the applicant's permit to drill. This process ensures that a Federal action conforms to a State, Tribal, or Federal Implementation Plan. The proposed wells are not located within the North Front Range CO or PM₁₀ maintenance areas, and therefore conformity analysis requirements for those pollutants do not apply. Emissions estimates for direct and indirect Oxides of Nitrogen (NO_x) and Reactive Volatile Organic Compounds (VOC), precursors for the formation of ground level ozone, was prepared for reasonably foreseeable oil and gas development activities for the well sites, and includes emissions from construction, production, and maintenance operations. 40 CFR 93.153 defines the de minimis thresholds for NO_x and VOC in a marginal or moderate ozone nonattainment area, and outside of any designated transport region, as 100 tons per year (tpy).

The subject activity construction phase is projected to last approximately 60 days. The life of the well, if economically viable, would be expected to sustain operations for approximately 20 – 30 years once production begins. Maximum foreseeable direct and indirect emissions would occur at the beginning of the project during the construction phase when production is also occurring.

The lease area is designated as a Class II Area, as defined by the Federal Prevention of Significant Deterioration (PSD) provision of the CAA. The PSD Class II designation allows for moderate growth or degradation of air quality within certain limits above baseline air quality. The closest Class I area to the proposed well site locations is Rocky Mountain National Park, which lies approximately 28 miles to the west.

Environmental Effects - Proposed Action

Direct and Indirect Impacts: In general the proposed action will have a temporary negative impact to air quality which will mostly occur during the construction phase. Utilization of the access road, surface disturbance, and construction activities such as drilling, hydraulic fracturing, well completion, and equipment installation will all impact air quality through the generation of dust related to travel, transport, and general construction. This phase will also produce short term emissions of criteria, hazardous, and greenhouse gas pollutants from vehicle and construction equipment exhausts. Once construction is complete the daily activities at the site will be reduced to operational and maintenance checks which may be as frequent as a daily visit. Emissions will result from vehicle exhausts from the maintenance and process technician visits. The pad can be expected to produce fugitive emissions of well gas, which contains mostly methane and a minor fraction of volatile organic compounds. Fugitive emissions may also result from pressure relief valves and working and breathing losses from any tanks located at the site, as well as any flanges, seals, valves, or other infrastructure connections used at the site. Liquid product load-out operations will also generate fugitive emissions of VOCs (and HAPs) and vehicular emissions. If the operator is unable to sell any produced gas from the well, then gas flaring will also produce emissions of criteria, HAP, and GHG emissions.

Ozone is not directly emitted like other criteria pollutants. Ozone is chemically formed in the atmosphere via interactions of oxides of nitrogen (NO_x) and volatile organic compounds (VOCs) in the presence of sunlight and under certain meteorological conditions (NO_x and VOCs are ozone precursors). Ozone formation and prediction is complex, generally results from a combination of significant quantities of VOCs and NO_x emissions from various sources within a region, and has the potential to be transported across long ranges. Therefore, it is typically not appropriate to assess (i.e. model) potential ozone impacts of a minor project on potential regional ozone formation and transport. However, the State of Colorado assesses potential ozone impacts from its authorizing activities on a regional basis when an adequate amount of data is available and where such analysis has been deemed appropriate. For this reason (inappropriate scale of analysis), ozone will not be further addressed in this document beyond the related precursor discussions, general conformity analysis and an appropriate qualitative analysis/comparison to background Weld County emissions inventories.

Emission estimates from the proposed well sites were calculated for this EA, and are disclosed in Tables 3.5 and 3.6 below. The emissions inventories (EI) considered reasonably foreseeable oil and gas development activities for the proposed wells, and includes emissions from both construction and production operations. The following pollutants were inventoried where an appropriate basis, methodology, and sufficient data exists: CO, NO_x (includes NO₂), PM_{2.5}, PM₁₀, SO₂, VOCs, HAPs, CO₂, CH₄, and N₂O. The EI was developed using reasonable but conservative scenarios for each activity. Production emissions were calculated based on full production activity for an entire year. Potential emissions were calculated for each new project well assuming the minimum/basic legally required emissions control measures, and common practices and equipment configurations data that was provided by oil and gas operators in the region.

The following assumptions were applied consistently to all potential activities:

- Given the lack of reasonably foreseeable activity on existing roads (lack of location, timing, activity volume, and types of vehicles), it was assumed current vehicular emissions would continue indefinitely, and at minimum would conform to growth outlined in the Draft (07/28/11) Denver-North Front Range (Northern Subarea) 8-Hour Ozone Conformity Determination. Although some or all of the traffic associated with this action would be included within the above reference conformity determination, no credit was taken to exclude vehicular traffic emissions from this analysis.
- The EI used a disturbed surface area of 1.5 acres on per well basis for Grant – Salisbury Battery and 2.4 acres on per well basis for the File Battery. Acreage estimates include pad, road and gather system infrastructure).
- All disturbed surfaces (pads and access roads) would receive appropriate application of water during construction phase and emissions calculations assume 50% dust control efficiency.

- All diesel fuel would be standard #2 grade (500 ppm sulfur) or better.
- Production phase equipment would include storage tanks, pneumatics, separation equipment, and well-head engines. Storage tanks emissions calculations assume 95% VOC control efficiency. Emissions calculations for pneumatic devices assume low-bleed rate devices. Note: all produced liquid at the File Pad will go to a centralized Liquid Handling Hub so there will be zero liquid storage at the File Battery location.
- Natural gas would be piped directly into a 3rd party gathering system. Completion flaring would be limited due to the implementation of green completions.
- Drill rigs, completion and fracing engines emissions are based on EPA Non-road Tier 2 emissions standards.
- Well-head engines are based on NSPS Subpart JJJJ Standards for NO_x and CO, AP-42 Table 3.2-1 for all other pollutants except GHGs; GHG factors from EPA Mandatory GHG Reporting, Part 98, Subpart C, Tables C-1 and C-2.
- The EI uses a DJ Basin representative natural gas analysis to estimate VOC and HAP speciation percentages.
- Fugitive well emissions are based on northern Colorado oil and gas operator provided well component counts.
- No New Source Review (minor) credit was taken (i.e. all emissions estimates are included in the analysis) for project stationary sources likely to receive permitting from APCD. Project related mobile source traffic emissions are also included in the analysis.

Emissions estimates in Tables 3-5 and 3-6 account for a full year of production and construction phase activities for four new federal wells for the Grant-Salisbury Battery and three new federal wells for the File Battery.

Figure 3-2 following Table 3-6 shows a zoomed in look at the Grant-Salisbury Battery location and includes locations of nearby active wells and shows wells that were drilled year 2008 through 2012. The figure also shows federal minerals layer.

Table 3-5. Estimated Maximum Annual Emissions – Grant–Salisbury Battery – Federal O&G

Activity	Annual Emissions (tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs	Benzene	n-Hexane	Formaldehyde	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	0.46	0.05	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Exhaust Emissions	0.31	0.30	11.69	0.47	2.86	0.59	0.06	---	---	---	1,547.76	1,404.50
Commuting Vehicles - Construction	3.23	0.47	2.64	0.01	0.77	0.13	0.01	---	---	---	88.04	79.89
Wind Erosion	0.10	0.02	---	---	---	---	---	---	---	---	---	---
Completion Venting (100% Green)	---	---	---	---	---	0.00	0.00	---	---	---	0.00	0.00
Sub-total: Construction	4.11	0.84	14.33	0.48	3.62	0.72	0.07	---	---	---	1,635.80	1,484.39
Well Workover Operations - Fugitive Dust	0.02	0.00	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - Exhaust	0.00	0.00	0.05	0.00	0.02	0.00	0.00	---	---	---	9.71	8.81
Wellpad Visits for Inspection & Repair	0.27	0.03	0.00	0.00	0.02	0.00	0.00	---	---	---	1.62	1.47
Wellhead Equipment Leaks	---	---	---	---	---	7.47	0.88	0.09	0.71	---	226.24	205.30
Misc. Wellhead Engines	0.06	0.06	3.98	0.00	6.81	0.20	0.02	---	---	0.09	191.76	174.01
Oil Tanks	---	---	---	---	---	69.14	1.78	0.26	1.19	---	0.62	0.56
Oil Related Traffic	0.09	0.02	0.15	0.00	0.04	0.01	0.00	---	---	---	19.96	18.11
Water Tanks	---	---	---	---	---	0.11	0.01	0.00	0.01	---	5.52	5.01
Water Related Traffic	0.03	0.01	0.07	0.00	0.02	0.00	0.00	---	---	---	8.60	7.80
Well Pad Heaters	0.05	0.04	0.64	0.00	0.53	0.04	0.00	---	---	---	768.28	697.17
Blowdown Venting	---	---	---	---	---	0.50	0.05	0.01	0.05	---	12.01	10.90
Gas Flaring	---	---	0.06	---	0.35	0.13	---	---	---	---	99.03	89.87
Sub-total: Operations	0.53	0.15	4.95	0.01	7.79	77.59	2.75	0.36	1.96	0.09	1,343.44	1,219.09
Resource Road Maintenance	0.04	0.00	0.02	0.00	0.01	0.00	0.00	---	---	---	2.38	2.16
Sub-total: Maintenance	0.04	0.00	0.02	0.00	0.01	0.00	0.00	0.00	0.00	0.00	2.38	2.16
Wellpad Reclamation	0.02	0.01	0.05	0.00	0.04	0.01	0.00	---	---	---	5.14	4.66
Sub-total: Reclamation	0.02	0.01	0.05	0.00	0.04	0.01	0.00	0.00	0.00	0.00	5.14	4.66
Total Emissions (tons)	4.70	1.00	19.34	0.49	11.46	78.32	2.82	0.36	1.96	0.09	2,986.75	2,710.30

Table 3-6. Estimated Maximum Annual Emissions – File Battery – Federal O&G

Activity	Annual Emissions (tons)								
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	0.37	0.04	---	---	---	---	---	---	---
Heavy Equipment Exhaust Emissions	0.24	0.23	8.77	0.35	2.14	0.44	0.04	1,160.82	1,053.38
Commuting Vehicles - Construction	2.43	0.35	1.98	0.01	0.57	0.10	0.01	88.04	79.89
Wind Erosion	0.14	0.02	---	---	---	---	---	---	---
Completion Venting (100% Green)	---	---	---	---	---	0.00	0.00	0.00	0.00
Sub-total: Construction	3.16	0.64	10.75	0.36	2.72	0.54	0.05	1,248.86	1,133.26
Well Workover Operations - Fugitive Dust	0.01	0.00	---	---	---	---	---	---	---
Well Workover Operations - Exhaust	0.00	0.00	0.05	0.00	0.02	0.00	0.00	9.54	8.66
Wellpad Visits for Inspection & Repair	0.20	0.02	0.00	0.00	0.02	0.00	0.00	1.21	1.10
Wellhead Equipment Leaks	---	---	---	---	---	5.60	0.66	169.68	153.97
Well Pad Heaters	0.04	0.03	0.48	0.00	0.40	0.03	0.00	576.21	522.88
Blowdown Venting	---	---	---	---	---	0.37	0.04	9.00	8.17
Gas Flaring	---	---	0.06	---	0.35	0.13	---	99.03	89.87
Sub-total: Operations	0.26	0.05	0.59	0.01	0.79	6.14	0.70	864.74	784.70
Resource Road Maintenance	0.03	0.00	0.01	0.00	0.00	0.00	0.00	1.79	1.62
Sub-total: Maintenance	0.03	0.00	0.01	0.00	0.00	0.00	0.00	1.79	1.62
Wellpad Reclamation	0.01	0.00	0.03	0.00	0.03	0.00	0.00	3.85	3.50
Sub-total: Reclamation	0.01	0.00	0.03	0.00	0.03	0.00	0.00	3.85	3.50
Total Emissions (tons)	3.46	0.70	11.39	0.37	3.53	6.68	0.76	2,119.24	1,923.08

Figure 3-2. Oil and Gas Development in Grant-Salisbury Battery Area



For this analysis, it is assumed that approximately 100% of the total emissions as shown in Tables 3-5 and 3-6 can be attributed to the federal oil and gas produced by the new 4 wells. As shown in Tables 3-5 and 3-6, the bulk (~ 82%) of the NO_x emissions occur during the 60 day construction period and production phase NO_x emissions are primarily related to well pad level engines exhaust. Particulate matter emissions are low for the project primarily due to emissions control with water application during construction phase. VOC emissions are highest during production phase mainly associated with fugitive leaks, storage tanks and blow-down activities.

Table 3-7 below demonstrates a relative comparison of the project emissions to Weld County's emissions from 2010.

Table 3-7. Proposed Action & Weld County Emissions Comparisons¹

Pollutant	Emissions, Tons per year (Max)		
	7 – Project Wells	Weld County Total Emissions (2010)	Weld County Oil & Gas Emissions (2010)
NO _x	30.7	30,365	15,016.9
CO	15.0	91,338	11,244.1
VOC	85.0	135,941	102,796.1
PM ₁₀	8.2	29,948	593.8
PM _{2.5}	1.7	No data	No data
SO _x	1.0	545	112.7
HAPs	3.6	354	150.6

¹ CDPHE 2010 APEN Online Emissions Inventory (most current available). CDPHE HAP inventory is for benzene only.

The APD projects, as designed and submitted, have been evaluated in accordance with the requirements of 40 CFR 93.153 subpart B and have been found to conform for the following reason(s):

7 – Grant Salisbury and File Batteries' Federal Wells:

[X] Potential maximum total Direct and Indirect emissions are below *de minimis* threshold levels (100 TPY) for each pollutant:

Ozone (NO_x): 30.7 tpy in 2014 (Maximum Year)
Ozone (VOC): 85.0 tpy in 2014 (Maximum Year)

Near-Field HAPs Screening-Level Analysis: Using the BLM Colorado near-field impacts screening-level tool, HAPs impacts were determined for the Grant-Salisbury Battery production emissions due to the location of the proposed oil and gas relative to nearby residences and buildings (i.e. public receptors). As shown in Figure 3-2, the Facility is located approximately 250 meters from businesses (businesses are due west of Facility). USEPA's recommended guideline model, AERMOD (version 12345), was used to predict maximum short-term (1-hour) and annual averaged ambient

concentrations for the following hazardous air pollutants (HAPs): Benzene, Formaldehyde and n-Hexane. Five years (2008-2012) of meteorology collected at the Greeley, Colorado airport was used to disperse the near-field pollutants. Production phase well-head equipment leaks, tanks and blow-down venting were modeled from a volume source at the Battery for predicting benzene and n-hexane impacts, and the well-head engines were modeled from a point source for modeling formaldehyde impacts.

Short-term (1-hour) HAP concentrations were compared to acute Reference Exposure Levels (RELs), shown in Table 3-8. RELs are defined as concentrations at or below which no adverse health effects are expected. No REL is available for n-hexane; instead, the available Immediately Dangerous to Life or Health divided by 10 (IDLH/10) values are used. These IDLH values were determined by the National Institute for Occupational Safety and Health (NIOSH) and were obtained from USEPA's Air Toxics Database (EPA 2011). These values approximate pollutant concentrations likely to produce mild effects during 1-hour exposures.

As shown in Table 3-8, all HAP maximum 1-hour concentrations (with inclusion of background concentrations) for all receptors are well below the REL or IDLH/10 reference concentrations. Maximum 1-hour benzene concentration is approximately 74% of REL, formaldehyde maximum 1-hour concentration is approximately 6% of REL and maximum 1-hour n-hexane is approximately 2% of its REL.

Table 3-8. 1-Hour HAP Maximum Concentration Comparison to RELs

HAP	Modeled Year	Maximum 1-Hour Modeled Concentration ($\mu\text{g}/\text{m}^3$)	Background Concentration ($\mu\text{g}/\text{m}^3$) ^a	Maximum Total Concentration ($\mu\text{g}/\text{m}^3$)	REL ($\mu\text{g}/\text{m}^3$)	Percent of REL (%)
Benzene	2008	807.08	18.34	825.42	1,300 ^b	63.5
	2009	638.79	18.34	657.13		50.5
	2010	747.29	18.34	765.63		58.9
	2011	916.75	18.34	935.09		71.9
	2012	948.74	18.34	967.08		74.4
Formaldehyde	2008	0.41	2.80	3.21	55 ^b	5.8
	2009	0.40	2.80	3.20		5.8
	2010	0.38	2.80	3.18		5.8
	2011	0.40	2.80	3.20		5.8
	2012	0.39	2.80	3.19		5.8
n-Hexane	2008	5972.93	66.97	6039.90	390,000 ^c	1.5
	2009	4727.51	66.97	4794.48		1.2
	2010	5530.48	66.97	5597.45		1.4
	2011	6784.62	66.97	6851.59		1.8
	2012	7021.35	66.97	7088.32		1.8

$\mu\text{g}/\text{m}^3$ = micrograms per cubic meter

REL = Reference Exposure Level

^a Background concentrations developed from EPA AQS data. (EPA 2014).

^b USEPA Air Toxics Database, Table 2 (EPA, 2011).

^c No REL available for these HAPs. Values shown are from Immediately Dangerous to Life or Health (IDLH/10), USEPA Air Toxics Database, Table 2 (EPA, 2011).

Long-term maximum potential exposure to HAPs are compared to Reference Concentrations for Chronic Inhalation (RfCs) in Table 3-9. An RfC is defined by USEPA as the daily inhalation concentration at which no long-term adverse health effects are expected. RfCs exist for both non-carcinogenic and carcinogenic effects on human health (EPA, 2012). Annual modeled HAP concentrations for each modeled HAP were compared directly to the non-carcinogenic RfCs shown in Table 3-9. The maximum modeled benzene, formaldehyde and n-hexane concentrations for all receptors are approximately 1.4 - 21.4 percent of their respective RfCs.

Table 3-9. Annual Average Predicted Concentrations Compared to RfCs

Pollutant	Year	Annual Modeled Concentration ($\mu\text{g}/\text{m}^3$)	Background Concentration ($\mu\text{g}/\text{m}^3$) ^a	Maximum Total Concentration ($\mu\text{g}/\text{m}^3$)	RfC ^b ($\mu\text{g}/\text{m}^3$)
Benzene	2008	0.49	5.97	6.46	30
	2009	0.49	5.97	6.46	
	2010	0.50	5.97	6.47	
	2011	0.51	5.97	6.48	
	2012	0.57	5.97	6.54	
Formaldehyde	2008	0.01	1.39	1.40	9.8
	2009	0.01	1.39	1.40	
	2010	0.01	1.39	1.40	
	2011	0.01	1.39	1.40	
	2012	0.01	1.39	1.40	
n-Hexane	2008	2.61	18.33	20.94	200
	2009	2.59	18.33	20.92	
	2010	2.64	18.33	20.97	
	2011	2.69	18.33	21.02	
	2012	3.01	18.33	21.34	

$\mu\text{g}/\text{m}^3$ = micrograms per cubic meter

RfC = Reference Concentration for Chronic Inhalation

^a Background concentrations developed from EPA AQS data. (EPA 2014).

^b USEPA Air Toxics Database, Table 1 (EPA, 2012).

Of the above HAPs, only benzene and formaldehyde are suspected to be carcinogenic.

RfCs for these HAPs are expressed as unit risk factors (URFs) and are shown in Table 3-10. Accepted methods for risk assessment were used to evaluate the incremental cancer risk for these pollutants. Based on the Superfund National Oil and Hazardous Substances Pollution Contingency Plan, a cancer risk range of 1 in a million to 100 in a million (10^{-6} to 10^{-4} risk) is generally acceptable (EPA 1990). Cancer risks for each individual HAP and for combined exposure to aggregated HAPs for both the maximally exposed individual (MEI) and most likely exposure (MLE) are within or below this range. A detailed explanation of this determination is provided below.

Annual total concentrations (modeled plus background) were multiplied by USEPA's URF (based on 70-year exposure) for those pollutants, and then the product was multiplied by an adjustment factor that represents the ratio of projected exposure time to 70 years. The adjustment factors represent two scenarios: a MLE scenario and one reflective of the MEI.

The MLE duration was assumed to be 9 years, which corresponds to the mean duration that a family remains at a residence (EPA 1993). This duration corresponds to an adjustment factor of $9/70 = 0.13$. The duration of exposure for the MEI was assumed to be 20 years (i.e., the LOP), corresponding to an adjustment factor of $20/70 = 0.29$. A second adjustment was made for time spent at home versus time spent elsewhere. For the MLE scenario, the at-home time fraction is 0.64 (EPA 1993), and it was assumed that during the rest of the day the individual would remain in an area where annual HAP concentrations would be one-quarter as large as the maximum annual average concentration. Therefore, the MLE adjustment factor was $(0.13) \times [(0.64 \times 1.0) + (0.36 \times 0.25)] = 0.095$. The MEI scenario assumed that the individual is at home 100 percent of the time, for a final adjustment factor of $(0.29 \times 1.0) = 0.29$. USEPA URFs and adjustment factors are shown in Table 3-10.

Cancer risk from benzene, formaldehyde, and the combined HAPs (benzene plus formaldehyde) are shown in Table 3-10. For the MLE, an individual could encounter a maximum cancer risk due to benzene of up to 4.84 in one million. The MLE risk due to formaldehyde is 1.73 in a million. The combined HAPs MLE risk is approximately 6.6 in one million. Cancer risks are greater for an MEI, with a risk of up to 14.8 (in one million) due to benzene exposure and up to 5.3 (in one million) for formaldehyde exposure.

Table 3-10. Cancer Risk From Long-Term Exposure

HAP	Year	Analysis	Carcinogenic RfC URF ^a 1/(μg/m ³)	Exposure Adj. Factor	Cancer Risk (per million)
Benzene	2008	MLE	7.8×10^{-6}	0.095	4.79E-06
		MEI	7.8×10^{-6}	0.29	1.46E-05
	2009	MLE	7.8×10^{-6}	0.095	4.79E-06
		MEI	7.8×10^{-6}	0.29	1.46E-05
	2010	MLE	7.8×10^{-6}	0.095	4.79E-06
		MEI	7.8×10^{-6}	0.29	1.46E-05
	2011	MLE	7.8×10^{-6}	0.095	4.80E-06
		MEI	7.8×10^{-6}	0.29	1.47E-05
	2012	MLE	7.8×10^{-6}	0.095	4.84E-06
		MEI	7.8×10^{-6}	0.29	1.48E-05
Formaldehyde	2008	MLE	1.3×10^{-5}	0.095	1.73E-06
		MEI	1.3×10^{-5}	0.29	5.29E-06
	2009	MLE	1.3×10^{-5}	0.095	1.729E-06
		MEI	1.3×10^{-5}	0.29	5.28E-06
	2010	MLE	1.3×10^{-5}	0.095	1.73E-06
		MEI	1.3×10^{-5}	0.29	5.28E-06
	2011	MLE	1.3×10^{-5}	0.095	1.73E-06
		MEI	1.3×10^{-5}	0.29	5.28E-06
	2012	MLE	1.3×10^{-5}	0.095	1.73E-06
		MEI	1.3×10^{-5}	0.29	5.28E-06
Total Combined	2008 to 2012	MLE MEI			6.58E-06 2.01E-05

MEI = maximally exposed individual

μg/m³ = micrograms per cubic meter

MLE = most likely exposure

URF = unit risk factor

^a USEPA Air Toxics Database, Table 1 (EPA 2012).

Greenhouse Gas Emissions and Climate Change: According to the U.S. Global Change Research Program (2009), global warming is unequivocal, and the global warming that has occurred over the past 50 years is primarily human-caused. Standardized protocols designed to measure factors that may contribute to climate change, and to quantify climatic impacts, are presently unavailable. Moreover, specific levels of significance have not yet been established by regulatory agencies. Predicting the degree of impact any single emitter of GHGs may have on global climate, or on the changes to biotic and abiotic systems that accompany climate change is highly complex, has

considerable uncertainty, and requires intense computer modeling (i.e., super computers). As such, no readily available tools exist to predict impacts a project's emissions would have on the global, regional, or local climate. This analysis is therefore limited to comparing the context of total project GHG emissions, and to emissions recently analyzed by EPA. The analysis also discloses readily available information regarding expected changes to the global climatic system and any empirical evidence of climate change that has occurred to date (see cumulative impacts).

The implementation of the Proposed Action Alternative is estimated to contribute 4,633 metric tons of carbon dioxide equivalent (CO₂(e)) in the maximum year. Annual operating GHG emissions will be 44% of the total emissions shown for the maximum year (see Tables 3-5 and 3-6). Over a 25 year timeframe, the total GHG emissions expected are approximately 53,011 metric tons CO₂(e) for the 7 new federal wells. The total provided does not account for the ultimate use or consumption of any produced minerals at this time due to the fact that the ultimate form of use and any additional processing required to render the product to sufficient quality (which would cause changes to the quantity of product) cannot be predicted with any reasonable certainty. Additionally, it should be noted that production values (also estimated at this time) could vary significantly over the life of the project, making any prediction of the quantities of GHG emitted highly speculative.

In 2007, Colorado's GHG emissions were 124,000,000 metric tons CO₂(e). The proposed action's GHG emissions represent about 0.004 % of the state of Colorado's GHG emissions. Given the relative magnitude of greenhouse gas emissions associated with the development of the 7 wells as compared to the state's GHG emission levels, the GHG contribution associated with the wells is extremely small.

To provide additional context, the EPA has recently modeled global climate change impacts from a model source emitting 20% more GHGs than a 1500MW coal-fired steam electric generating plant (approx. 14,132,586 metric tons per year of CO₂, 273.6 metric tons per year of nitrous oxide, and 136.8 metric tons per year of methane). It estimated a hypothetical maximum mean global temperature value increase resulting from such a project. The results ranged from 0.00022 and 0.00035 degrees Celsius occurring approximately 50 years after the facility begins operation. The modeled changes are extremely small, and any downsizing of these results from the global scale would produce greater uncertainty in the predictions. The EPA concluded that even assuming such an increase in temperature could be downscaled to a particular location, it "would be too small to physically measure or detect", see Letter from Robert J. Meyers, Principal Deputy Assistant Administrator, Office of Air and Radiation re: "Endangered Species Act and GHG Emitting Activities (Oct. 3, 2008). The project emissions are a fraction of the EPA's modeled source and are shorter in duration, and therefore reasonable to conclude that the project would have no measurable impact on the climate.

Table 3-7. Greenhouse Gas Emission Comparisons

Inventory Description	CO₂e Emissions (10⁶ mtpy)	Proposed Action Percentage
Colorado (2007)	124	0.004
Total US Greenhouse Gases ¹	6,957	0.00007

¹ *Inventory of US Greenhouse Gas Emissions and Sinks: 1990–2008* (EPA 2010a) EPA Emissions

Cumulative Impacts: The area currently has a high degree of alteration in the form of agricultural fields, roads, houses, and oil and gas production. The addition of the infrastructure needed to construct and drill the additional pad and well would have a cumulative impact to the area's air quality; however, given the existing level of development in the area, the proposed well's impact would be very minor. In the long term, if economical quantities of oil and gas are found, additional wells can be expected to be drilled on Federal, State, and private lands. This could result in a larger impact to air quality in the future.

The BLM – Colorado is currently conducting a Colorado-wide modeling study (CARMMS) of impacts associated with oil and gas development that will include analyses for each BLM Field Office including the RGFO. For the CARMMS, BLM is modeling oil and gas emissions increases projected out 10 years from year 2011 according to RFD and recent oil and gas development data, and will identify the predicted potential impacts for each Field Office for year 2021. Regional ozone and other pollutants and air quality related values (AQRVs) including visibility impacts and deposition will be evaluated in the CARMMS. As future oil and gas development occurs, the BLM Colorado plans to compare project-specific permitted levels of emissions to the RGFO oil and gas emissions rates modeled in the CARMMS while considering the CARMMS modeling results to confirm that activities approved by the BLM Colorado are within the modeled emissions analyzed in the CARMMS. As oil and gas is expected to increase in the region, other emissions levels are expected to increase or decrease and the net overall cumulative effect will be modeled in the BLM CARMMS. Annual reports (projected to start in mid-2014) will disclose an analysis for previous year permitted activities that will ultimately be used to permit new activities.

With respect to GHG emissions, the following predictions were identified by the EPA for the Mountain West and Great Plains region:

- The region will experience warmer temperatures with less snowfall.
- Temperatures are expected to increase more in winter than in summer, more at night than in the day, and more in the mountains than at lower elevations.
- Earlier snowmelt means that peak stream flow will be earlier, weeks before the peak needs of ranchers, farmers, recreationalist, and others. In late summer, rivers, lakes, and reservoirs will be drier.
- More frequent, more severe, and possibly longer-lasting droughts will occur.
- Crop and livestock production patterns could shift northward; less soil moisture due to increased evaporation may increase irrigation needs.

- Drier conditions will reduce the range and health of ponderosa and lodge pole pine forests, and increase the susceptibility to fire.
- Grasslands and rangelands could expand into previously forested areas.
- Ecosystems will be stressed and wildlife such as the mountain line, black bear, long-nose sucker, marten, and bald eagle could be further stressed.

If these predictions are realized as mounting evidence suggests is already occurring, there could be impacts to resources within the region. For example, if global climate change results in a warmer and drier climate, increased particulate matter impacts could occur due to increased windblown dust from drier and less stable soils. Warmer temperatures with decreased snowfall could have an impact on a particular plants ability to sustain itself within its current range. An increased length of growing season in higher elevations could lead to a corresponding variation in vegetation and change in species composition. These types of changes would be most significant for special status plants that typically occupy a very specific ecological niche. Cool season plant species' spatial ranges are predicted to move north and to higher elevations, and extinction of endemic threatened or endangered plants may be accelerated. Invasive plant species would be more likely to out-compete native species.

Increases in winter temperatures in the mountains could have impacts on traditional big game migration patterns. Due to loss of habitat, or due to competition from other species whose ranges may shift northward, the population of some animal species may be reduced. Warmer winters with less snow would impact the Canada lynx by removing a competitive advantage they have over other mountain predators. Earlier snowmelt could also have impacts on cold water fish species that occupy streams throughout the planning area. Climate change could affect seasonal frequency of flooding and alteration of floodplains, which could impact riparian conditions. More frequent and severe droughts would have impacts on many wildlife species throughout the region as well as vegetative composition and availability of livestock forage in some areas. Climate change could increase the growing season within the region, however, so longer growing season in theory would result in more forage production provided there is sufficient precipitation. Drier conditions could have severe impacts on forests and woodlands. This could leave these forests and woodlands more susceptible to insect damage and at higher risk of catastrophic wildfires. Increased fire activity and intensity would increase greenhouse gas emissions.

Protective / Mitigation Measures: Multiple near-field modeling assessments performed by the BLM Colorado for Colorado-based oil and gas air quality assessments indicate that water (or product with equivalent dust control) application to unpaved surfaces is necessary during the oil and gas development / construction phase to achieve air quality compliance even though construction phases last just a few months. The short-term particulate matter air quality standards do not allow for many exceedances per year and therefore could be exceeded multiple times with only a couple of weeks of non-emissions controlled construction activities.

As shown in Figure 3-1, the project is located within the 8-hr ozone NAA boundary. Air quality monitors are used to indicate whether an area is in compliance with air quality standards and the EPA is currently re-evaluating the 8-hr ozone standard and is possibly

going to reduce the standard in the near future. For these reasons, it is appropriate to suggest that the applicant apply the oil and gas NSPS OOOO requirements (Table 3-4) to all activities regardless if the well is classified as oil or as gas (NSPS OOOO regulations currently apply to “natural gas” wells). These suggestions include the assumptions for the emissions inventory for this analysis which account for green completions, 95% VOC controls on all storage tanks and low-bleed pneumatic devices. It is also suggested that no natural gas is vented to the atmosphere during liquid truck loading, well blow-downs or maintenance or re-working of a well, but rather captured or combusted using a flare or combustion device. These actions would greatly reduce the overall project related ozone precursor VOC and HAPs emissions.

It is anticipated that the operator would apply for either an APCD air permit for the site as a whole, or cover individual equipment under one of Colorado’s general permits for oil and gas operations. The state as the regulatory authority for oil and gas actions requires controls of emissions and standards for compliance that the operator will be subject to. It is expected that the operator will comply with the requirements and make every effort to minimize emissions through good engineering and operating practices to the maximum extent practical.

The following BLM requirements will apply:

- COA – comply with all applicable State and Federal Standards.
- COA - all drill rigs, fracing and completion related engines will be required to meet EPA Non-Road Tier II Emissions Standards (or cleaner) for all well development operations.
- COA – applicant will apply water or dust-suppressant to unpaved surfaces likely to be disturbed (roads and well pad) to achieve at least 50% dust control during construction / well development phase.
- COA - green completion will be implemented for all well developments.
- COA - VOC emissions controls achieving at least 95% control efficiency will be applied to all storage tanks.
- COA – the applicant is required to operate low-bleed pneumatic devices only for the project wells.
- COA – the applicant will control emissions during liquid truck loading.
- The applicant will minimize natural gas venting during well blow downs or maintenance or re-working of a project well.

No Action Alternative

Direct and Indirect Impacts: None

Cumulative Impacts: None

Mitigation/Residual Effects: None

3.2.2 GEOLOGIC AND MINERAL RESOURCES

Affected Environment: The proposed wells are located within the Wattenberg gas field in the Denver Basin, where the primary target is the Codell/Niobrara oil and gas. Most oil and gas in the Denver Basin has been produced from Cretaceous sandstones: J-Sandstone, Codell Sandstone, Niobrara Formation, Hygiene Sandstone, and Terry Sandstone (also known informally as the Sussex and Shannon Sandstones).

The Project Area is surrounded by privately owned producing gas wells on a Colorado state spacing order of 20 acres per well.

Groundwater resources in the area include the Laramie-Fox Hills aquifer, the lowermost of the Denver Basin aquifer system. The aquifer underlies approximately 6,700 square miles and marks the areal extent of the basin for economic ground water development. The Laramie-Fox Hills aquifer is from 250 to 300 feet thick, and includes about 150 to 200 feet of fine-grained and medium-grained sandstone. Water is also present in the Upper Pierre Shale at depths of up to 1,500 feet (CDWR, 2013). Water from the aquifer is used extensively throughout the area for domestic and agricultural purposes. Well yields may be as high as 100 gallons per minute (GPM), but are generally somewhat lower. Both the Laramie-Fox Hills and Arapahoe aquifers are under artesian pressure at the present time.

In addition to oil and gas, uranium and coal resources are also found in Weld County. Uranium resources are found in the Upper Laramie Formation north of Greeley. Coal resources are found throughout the Denver Basin in the Denver Formation and the upper Laramie Formation in the Denver Basin, although most of the coal resources in the Denver Basin have come from Laramie Coals. Sand and gravel resources are also located throughout Weld County; several sand and gravel pits have also been developed within five miles of the proposed wells.

Environmental Effects

Proposed Action (Direct and Indirect Impacts)

The Proposed Action would drill through the Laramie-Fox Hills aquifer to produce hydrocarbons from underlying formations. The Laramie formation contains important coal and uranium deposits. During drilling operations on parcels, loss of circulation or problems cementing the surface casing could directly affect freshwater aquifer and mineral zones encountered. Known water-bearing zones in the APD areas would be protected by drilling requirements and, with proper practices, contamination of ground water resources is highly unlikely.

No Action Alternative (Direct and Indirect Impacts)

Under the No Action alternative, the APDs would be denied, and no federal action would occur. Not approving the APDs could result in a situation in which reservoirs are not adequately developed, and public minerals could be drained by nearby private or state wells. The applicant could explore and develop the private land and private minerals and not access the federal minerals. Drainage cases commonly occur in northeastern Colorado where land and mineral ownership patterns are complex.

Protective/Mitigation Measures

Onshore Order #2 requires that the proposed casing and cementing programs shall be conducted as approved to protect and/or isolate all usable water zones and prospective mineral zones. At the APD stage, geologic and engineering reviews will be completed to ensure that cementing and casing programs are adequate to protect all downhole resources. Known water bearing zones in the APD area are protected by drilling requirements and, with proper practices, contamination of ground water resources is highly unlikely. Casing along with cement would be extended well beyond fresh-water zones to ensure that drilling fluids remain within the well bore and do not enter groundwater.

3.2.3 SOILS

Affected Environment:

The Weld county soil survey has identified the soil series in the proposed project area as:

For the Grant Salisbury:

The proposed pad and part of the access would be on the Vona sandy loam, 1-5% slopes. Part of the access would also be on the Olney fine sandy loam 0-1% slopes. These soils are on plains. The parent material consists of mixed deposit outwash and eolian deposits. Depth to a root restrictive layer is greater than 80 inches. The natural drainage class is well drained. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 80 inches. These soils are in the R067BY024CO Sandy Plains ecological site. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 15 percent. The Olney fine sandy Loam is listed as a Prime Farmland when irrigated.

For the File pad:

This entire disturbance would be on the Olney fine sandy loam 0-3% slopes. These soils are described above for the Grant Salisbury pad.

Environmental Effects

The proposed development could result in a small percent of increased wind erosion during initial operations of associated with construction and drilling. A high risk of windblown erosion will continue until those disturbed lands are hardened, reclaimed by vegetation cover, protected by tackifier, straw, or manure, or protected by other methods. Overall-negative effects to soil resources, such as loss of top soil resulting from wind erosion should be reduced significantly through the correct implementation of interim and final reclamation measures and the implementation of BMPs during the construction.

Proposed Action

Direct and Indirect Impacts: This action would result in up to 22.75 acres of total surface disturbance related to oil and gas activity; however all lands involved are currently disturbed by irrigated agriculture. Long term disturbance after interim reclamation would be approximately 10 acres. A total of approximately 6 acres of Prime Farmland would be taken out of production until final reclamation is complete. This is assuming successful interim reclamation including re-contouring, seeding, and necessary stabilization. Considering the disturbance related to the agricultural activity on the site, direct soil impacts would be small. Indirectly, the increased runoff from the disturbed soils could result in increased erosion and gulying down gradient. Due to the gentle slopes and construction standards being proposed impacts to soils off site would be minor.

Cumulative Impacts: The area around the proposed wells has a variety factors effecting soils including roads, housing, agriculture, and livestock grazing. The addition of the infrastructure needed to drill the pads would have an additional impact to the areas soils. In the long term, if economical quantities of oil and gas are found, additional wells can be expected to be drilled. This could add a large amount of disturbance that could have a larger impact on soils in the future.

Mitigation/Residual Effects: After completion and/or abandonment of the wells, the soils would still be irreversibly different than they originally were. Overall, with the proposed reclamation, soil productivity would not be considerably altered if the proposed areas are abandoned. All infrastructure (roads, drill pads, etc.) being proposed, would be built to BLM Gold Book standards. No additional mitigation would be required.

No Action Alternative

Direct and Indirect Impacts: It is likely that under this alternative the facilities would still be constructed on entirely private property and the impacts to soil resources would be the same.

Protective/Mitigation Measures: N/A

3.2.4 WATER (SURFACE AND GROUNDWATER, FLOODPLAINS)

Affected Environment: The proposed wells would be located in an irrigated upland setting within the South Platte River basin with no perennial surface water nearby. Groundwater in this area consists of shallow alluvial water tributary to the Saint Vrain River and the Laramie Fox-Hills aquifer. Both these aquifers are used for domestic and agricultural purposes and the Laramie-Fox Hills is generally produced from artesian wells. The Lower Fox Hills and upper Pierre Aquifer or upper transition zone of the Pierre shale are also important water resources that should be protected, this interval occurs at depths of about 600' to 1500'. Underlying the Fox Hills is nearly 5,000 feet of Pierre Shale. Based on state records, there are numerous water wells within a one mile radius of the proposed wells and target downhole locations. Many of these are located near the State Highway 119 and Interstate 25 interchange and are likely monitoring wells. Water required for the drilling and completion of the wells would be obtained from a nearby water well (permit #69175) located in the SWSW Section 26, T12N-R58W and transported via truck to the proposed location.

Environmental Effects

Proposed Action

Direct and Indirect Impacts: Surface water impacts of the proposed wells are mainly associated with the surface disturbance associated with drilling and related infrastructure after well completion. For all proposed development, 22.75 acres would be disturbed. All of this disturbance would be located in producing, irrigated agricultural fields that are already heavily disturbed. Most impacts to surface water from oil and gas activity is due to removal of vegetation and exposure of mineral soils. Specific impacts would be soil compaction caused by construction that would reduce the soil infiltration rates, in turn increasing runoff during precipitation events. Downstream effects of the increased runoff may include changes in downstream channel morphology such as bed and bank erosion or accretion. Due to the, previous disturbance, flat nature of the topography and infiltration rates of the soils in this area, little to no new impacts to surface water quality would result from the surface disturbance portion of drilling the proposed wells. Additional surface water impacts could result from chemicals, or other fluids, accidentally spilled or leaked during the development process and could result in the contamination of both ground and surface waters. Best management practices would be contained in the condition of approval that would mitigate this threat.

The drilling of the proposed wells would pass through usable groundwater. Groundwater in this area is relied on for agricultural uses, as well as, domestic use. Potential impacts to groundwater resources could occur if proper cementing and casing programs are not followed.

This could include loss of well integrity, surface spills, or loss of fluids in the drilling and completion process. It is possible for chemical additives used in drilling activities to be introduced into the water producing formations without proper casing and cementing of the well bore. Changes in porosity or other properties of the rock being drilled through can also result in the loss of drilling fluids. When this occurs, drilling fluids can be introduced into groundwater without proper cementing and casing. Site specific conditions and drilling practices determine the probability of this occurrence and determine the groundwater resources that could be impacted. In addition to changing the producing formations' physical properties by increasing the flow of water, gas, and/or oil around the well bore; hydraulic fracturing can also introduce chemical additives into the producing formations. Types of chemical additives used in drilling activities may include acids, hydrocarbons, thickening agents, lubricants, and other additives that are operator and location specific. These additives are not always used in these drilling activities and some are likely to be benign such as bentonite clay and sand. Concentrations of these additives also vary considerably since different mixtures can be used for different purposes in oil and gas development and even in the same well bore. If contamination of aquifers from any source occurs, changes in groundwater quality could impact springs and water wells that are sourced from the affected aquifers. Onshore Order #2 requires that the proposed casing and cementing programs shall be conducted as approved to protect and/or isolate all usable water zones.

At this stage, geologic and engineering reviews have been done to ensure that cementing and casing programs are adequate to protect all downhole resources. Known water bearing zones in the APD area are protected by drilling requirements and, with proper practices, contamination of ground water resources is highly unlikely. Casing along with cement would be extended well beyond fresh-water zones to insure that drilling fluids remain within the well bore and do not enter groundwater.

Protective/Mitigation Measures: No additional mitigation is required to protect water resources beyond what is found in other sections of this document and other APD approval requirements.

No Action Alternative

Direct and Indirect Impacts: It is likely that under this alternative the facilities would still be constructed on entirely private property and the impacts to water resources would be the same.

Protective/Mitigation Measures: None

3.3 BIOLOGICAL RESOURCES

3.3.1 INVASIVE PLANTS*

Affected Environment: Vegetation and soils in the project area have been modified, both structurally and chemically, by long-term exposure to agricultural practices. Invasive plants are common in the area. The project site are prone to a wide variety of weeds if severe soil surface disturbance occurs.

Environmental Effects

Proposed Action

Direct and Indirect Impacts: Due to the long-term exposure of the project area to historical agricultural practices, expected impacts are thought to be minor.

Protective/Mitigation Measures: Equipment used to implement the proposed action should be washed prior to entering the project area to remove any plant materials, soil, or grease. Areas disturbed by project implementation will be monitored for the presence of weeds on the Colorado State Noxious Weed list. Identified noxious weeds will be treated. Monitoring is required for the life of the project and for three years following completion and/or abandonment of the wells and elimination of identified Colorado State Noxious Weeds list A and B species.

No Action Alternative

Direct and Indirect Impacts: None

Protective/Mitigation Measures: None

*Invasive plants are plants that are not part of (if exotic), or are a minor component of (if native), the original plant community or communities that have the potential to become a dominant or co-dominant species on the site if their future establishment and growth are not actively controlled by management interventions, or are classified as exotic or noxious plants under state or federal law. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants.

3.3.2 VEGETATION

Affected Environment: The project area is currently in use for crop agriculture, and will likely continue to be used for crops after completion of the project.

Environmental Effects

Proposed Action

Direct and Indirect Impacts: Generally oil and gas development involves complete removal of vegetation and at times re-contouring of the landscape to allow for resources to be retrieved. The type of ground activity associated with oil and gas development does result in increased susceptibility to adverse impacts such as soil compaction, weed infestations and erosion.

Protective/Mitigation Measures: See 2.1.1 Proposed Action.

No Action Alternative

Direct and Indirect Impacts: None

Protective/Mitigation Measures: None

3.3.3 THREATENED, ENDANGERED AND SENSITIVE SPECIES

Affected Environment

The U.S. Fish and Wildlife Service (USFWS) lists threatened, endangered, and candidate species per the Endangered Species Act (ESA). The USFWS periodically posts a list of species having

threatened (T), endangered (E), and candidate (C) status and with the potential to occur in the area. The USFWS 2012 list for Weld County includes Mexican spotted owl (T), piping plover (T), least tern (E), black-footed ferret (E), Preble's meadow jumping mouse(T), Ute ladies'-tresses orchid (T), and Colorado butterfly plant (T). There are no candidate species listed for Weld County.

Suitable habitat does not exist for the threatened and endangered species with the potential to occur in the project area. There is no suitable habitat in the project area for Mexican spotted owl, which resides in old growth or mature forests, nor is there any nearby water to support for piping plover or least tern. There is no suitable habitat for Preble's meadow jumping mouse and the two listed plants due to the lack of riparian and wetland communities within the Project Area. The U.S. Fish and Wildlife Service (USFWS), in coordination with the Colorado Division of Wildlife, has block-cleared all black-tailed prairie dog habitat in eastern Colorado, including Weld County. They have determined that these areas no longer contain any wild free-ranging black-footed ferrets (USFWS 2009).

Mountain plover is listed as a Bureau of Land Management sensitive species in the state of Colorado. Mountain plovers are a migratory bird that does nest on the eastern plains of Colorado. Agricultural fields function as nesting habitat in this region of the state.

Environmental Effects

Because there is no suitable habitat within the Project Area, there would be no effect to threatened or endangered species are anticipated under the Proposed Action or the No Action alternative. Mountain plover, a BLM sensitive species is known to nest in agricultural fields along the eastern plains of Colorado. Surface disturbing activities that occur during the nesting season may negatively impact individual birds, but would likely have no impact on the population.

Protective/Mitigation Measures See Migratory bird section..

3.3.4 WILDLIFE TERRESTRIAL

Affected Environment

The project area is located in what once was shortgrass prairie, but has now been converted to agricultural fields. In the past they have supported an array of wildlife species including black-tailed prairie dog, American bison, elk, deer, and Pronghorn. However, the lands in their current form provide very little benefit to wildlife. Wildlife in the area is limited to species that have adapted to the increased development activity in the area; these include pronghorn, small mammals, mesocarnivores, raptors, and herpetofauna.

Environmental Effects

Proposed Action (Direct and Indirect Impacts)

The Proposed Action would convert lands from one high impact anthropogenic use (agricultural production) to another (oil and gas development). There would be a minor direct loss of suitable wildlife habitat in the area to species that have adapted to an agriculture setting, however, that loss will be negligible. Indirect impacts to wildlife could result from the increase in human

activity during the drilling phase, causing an increase in stress to wildlife or limiting movement throughout the Project Area. Decreased human activity during the production phase would reduce these potential indirect impacts to wildlife as well.

[No Action Alternative \(Direct and Indirect Impacts\)](#)

Under the No Action alternative, the applicant could explore and develop the private land and private minerals and not access the federal minerals. Direct and indirect impacts to terrestrial wildlife would be the same as under the Proposed Action alternative.

[Protective/Mitigation Measures](#) N/A.

3.3.5 MIGRATORY BIRDS

The Migratory Bird Treaty Act (MBTA) includes guidance for the protection of native passerines (songbirds) as well as birds of prey, migratory waterbirds (waterfowl, wading birds, and shorebirds), and other species such as doves, hummingbirds, swifts, and woodpeckers. Within the context of the MBTA, “migratory” birds include non-migratory “resident” species as well as true migrants, essentially encompassing most native bird species. The nesting time period is of special importance as the ability to create a nest, incubate, and rear chicks to fledging is a vulnerable time period for birds, and disturbances to nesting activities can lead to larger consequences for individual birds. In addition, because birds are generally territorial during the nesting season, their ability to access and utilize sufficient food is limited by the quality and availability of the territory occupied. During non-breeding seasons, birds are generally non-territorial and able to feed across a larger area and wider range of habitats.

[Affected Environment](#)

The Proposed Action is located in agricultural fields. The following species are on the U.S. Fish and Wildlife Services “Birds of Conservation Concern-2008 List” for BCR-18 (Shortgrass Prairie) and might occur in the project area based on their habitat requirements: ferruginous hawks, prairie falcons, mountain plovers, upland sandpiper, Sprague’s pipit, lark buntings, and Cassin’s sparrow. However, species that have adapted to this setting (i.e. mountain plover) would be most affected.

[Environmental Effects](#)

[Proposed Action \(Direct and Indirect Impacts\)](#)

The Project Area and surrounding area is already disturbed agricultural production. Some birds have adapted to and currently use habitat patches within fields for reproduction and growth. Surface disturbing activities associated with implementation of the Proposed Action could impact nesting species (i.e. mountain plover) if conducted during the nesting season. Noise generated during construction, drilling, and production phases will likely result in a larger impact footprint than the disturbance footprint alone.

[No Action Alternative \(Direct and Indirect Impacts\)](#)

Under the No Action alternative, the applicant could explore and develop the private land and private minerals and not access the federal minerals. Direct and indirect impacts to migratory birds would be the same as described for the Proposed Action.

Protective/Mitigation Measures

To be in compliance with the Migratory Bird Treaty Act (MBTA) and the Memorandum of Understanding between BLM and USFWS required by Executive Order 13186, BLM must avoid actions, where possible, that result in a “take” of migratory birds. Under the MBTA, “take” means to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in such conduct. All mortality or injury to species protected by the MBTA shall be reported immediately to the BLM project lead and to the USFWS representative.

Pursuant to BLM Instruction Memorandum 2008-050, to reduce impacts to Birds of Conservation Concern (BCC), no habitat disturbance (removal of vegetation such as timber, brush, or grass) is allowed during the periods of May 15 - July 15, during the breeding and brood rearing season for most Colorado migratory birds. An exception to this TL will be granted if nesting surveys conducted no more than one week prior to surface-disturbing activities indicate no nesting within 30 meters (100 feet) of the area to be disturbed, specifically for mountain plover, which are known to nest in agricultural fields. Surveys shall be conducted by a qualified breeding bird surveyor between sunrise and 10:00 a.m. under favorable conditions. This provision does not apply to ongoing construction, drilling, or completion activities that are initiated prior to May 15 and continue into the 60-day period.

Any secondary containment system will be covered in a manner to prevent access by migratory birds. The operator will construct, modify, equip, and maintain all open-vent exhaust stacks on production equipment to prevent birds and bats from entering, and to discourage perching, roosting, and nesting. Production equipment includes, but may not be limited to, tanks, heater-treaters, separators, dehydrators, flare stacks, and in-line units. Any action that may result in a “take” of individual migratory birds or nests that are protected by MBTA will not be allowed.

3.4 HERITAGE RESOURCES AND HUMAN ENVIRONMENT

3.4.1 ECONMOMICS

Although this project only affects the outcome of 7 proposed wells, the Oil and Gas industry as a whole has a significant impact on the economy. Not only does oil and gas development directly create higher than average paying jobs, it also increase demand for employees of related support fields, such as transportation, equipment fabrication, construction, gas stations, restaurants ect. Aside from the creation of jobs, the production of oil and gas directly generates revenue for federal, state and local governments through taxes, fees and royalties.

A 2013 study by the CU Leeds School of Business (Lewandowski and Wobbekind,2013) illustrated the economic benefits of oil and gas development in Colorado. It showed that the oil and gas industry directly contributed almost \$1.6 billion to state and local governments, schools and other special districts in Colorado in 2012. The study found that oil and gas development accounted for about 51,200 jobs in Colorado, most of which pay more wages more than twice of the average wage in the state. In addition, it was estimated that the industry resulted in 60,245 indirect and induced jobs in Colorado, for a total of 111,476 jobs supported by the oil and gas development industry in the state in 2012. The study concluded that the oil and gas industry generated \$29.6 billion in output in Colorado’s economy in 2012.

These figures don't account for the fees, royalties and lease payments made to the federal government for development of federal oil and gas estate, or take into account the positive economic impact that results from the use of affordable petroleum products for fuels and the products manufactured with them. The production of domestic petroleum products has the added benefit of reducing the nation's dependence on foreign energy.

3.4.2 PALEONTOLOGICAL RESOURCES

Affected Environment: The proposed wells are geographically located on cultivated, irrigated cropland located near the I-25 corridor, north of the Denver-Metro area, in the Wattenberg Field on the eastern flank of the Denver Basin. The Basin consists of a large asymmetric syncline of Paleozoic, Mesozoic, and Cenozoic sedimentary rock layers, trending north to south along the east side of the Front Range from about Pueblo north to Wyoming. The basin is deepest near Denver and ascends gradually to its eastern outcrop in central Kansas. The Laramie/Fox Hills Formation and Quaternary Gravels underlie the proposed well locations. These are both Class 3 geologic formations, according to the BLM's Potential Fossil Yield Classification (PFYC) System, which was created to assist in determining proper mitigation approaches for surface disturbing activities (WO IM2008-009). They are Class 3 formations because they have moderate potential to contain vertebrate fossils or scientifically significant non-vertebrate fossils. The potential for a project to be sited on or impact a significant fossil locality is low, but somewhat higher for common fossils. Management concern for paleontological resources is moderate.

Environmental Effects

Proposed Action (Direct and Indirect Impacts)

Although the project area does not contain any known fossil resources, there is a possibility that ground disturbing work in the area may uncover fossil resources. Adverse significant impacts to paleontological resources can be reduced to a negligible level through mitigation of ground disturbing activities. It is possible that the proposed project would have the beneficial impact that ground disturbance activities might result in the discovery of important fossil resources.

No Action Alternative (Direct and Indirect Impacts)

Under the No Action alternative, the applicant could explore and develop the private land and private minerals and not access the federal minerals. Direct and indirect impacts to paleontological resources would be the same as those described for the Proposed Action.

Protective/Mitigation Measures

In order to prevent potential impacts to paleontologic resources, a stipulation will be attached to the APD that directs the holder to notify the BLM RGFO immediately if any vertebrate fossils or their traces are discovered during operations. Operations may continue as long as the fossil specimen would not be damaged or destroyed by the activity. Within 5 working days of notification, the BLM RGFO shall evaluate or have evaluated such discoveries and shall notify the operator what action shall be taken with respect to such discoveries. If any significant fossils are found, development of a research design and data recovery may also be recommended before the project proceeds. Any fossils recovered on private land belong to the private landowner;

however, the BLM recommends the use of a federally approved repository for storage of any fossils recovered in these efforts.

In many instances where the surface estate is not owned by the federal government, the mineral estate is, and is administered by the BLM. Paleontological resources are considered to be part of the surface estate. If the BLM is going to approve an action involving the mineral estate that may affect the paleontological resources, the action should be conditioned with appropriate paleontological mitigation recommendations to protect the interests of the surface owner. The surface owner may elect to waive these recommendations; such a waiver must be documented in the casefile.

3.4.2 WASTES, HAZARDOUS OR SOLID

Affected Environment: It is assumed that conditions associated with the proposed project site, both surface and subsurface, are currently clean and that there is no known contamination. A determination will be made by the operator prior to initiating the project, if there is evidence that demonstrates otherwise (such as solid or hazardous wastes have been previously used, stored, or disposed of at the project site).

Nothing in the analysis or approval of this action by BLM authorizes or in any way permits a release or threat of a release of hazardous materials (as defined under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. 9601 et seq., and its regulations) into the environment that will require a response action or result in the incurrence of response costs.

Environmental Effects

Proposed Action

Direct and Indirect Impacts: Possible contaminant sources associated with the drilling operations are:

- Storage, use and transfer of petroleum, oil and lubricants
- Produced fluids
- General hazardous substances, chemicals and/or wastes
- Concrete washout water
- Drilling water, mud and cuttings

Protective/Mitigation Measures: The following mitigation will assist in reducing potential spills resulting in groundwater and/or soil contamination:

- All Above Ground Storage Tanks will need to have secondary containment and constructed in accordance with standard industry practices or an associated Spill Prevention Control and Countermeasures plan in accordance with State regulations (if applicable).
- If drums are used, secondary containment constructed in accordance with standard industry practices or governing regulations is required. Storage and labeling of drums should be in accordance with recommendations on associated MSDS sheets, to account for chemical characteristics and compatibility.
- Appropriate level of spill kits need to be onsite and in vehicles.
- All spill reporting needs to follow the reporting requirements outlined in NTL-3A.

- No treatment or disposal of wastes on site is allowed on Federal Lands.
- All concrete washout water needs to be contained and properly disposed of at a permitted offsite disposal facility.
- If pits are utilized they need to be lined to mitigate leaching of liquids to the subsurface, as necessary. State and/or Federal regulations may apply to pit construction and removal.

No Action Alternative

Direct and Indirect Impacts: None

Protective/Mitigation Measures: None

3.5 CUMULATIVE IMPACTS SUMMARY

The proposed project is located in Weld County, Colorado. Weld County's economy is based primarily on agriculture (farming and livestock production) and oil and gas development. Due to this, most of the natural landscape of Weld County has been modified. Weld County has more than 20,000 active petroleum wells, more than any other county in the United States, according to Weld county commissioners. Most of these wells are located on privately owned surface and produce entirely privately owned minerals. BLM is involved in less than 5% of all petroleum wells in Weld County. Because of the comparatively small number of federally owned mineral parcels in this area, the cumulative impact of Federal petroleum development is insignificant in comparison to the impact of the overall petroleum development in Weld County.

Air: The area currently has a high degree of alteration in the form of agricultural fields, roads, houses, and oil and gas production. The addition of the infrastructure needed to construct and drill the additional pad and well would have a cumulative impact to the area's air quality; however, given the existing level of development in the area, the proposed well's impact would be very minor. In the long term, if economical quantities of oil and gas are found, additional wells can be expected to be drilled on Federal, State, and private lands. This could result in a larger impact to air quality in the future.

Soils: The area around the proposed wells has a variety factors effecting soils including roads, housing, agriculture, and livestock grazing. The addition of the infrastructure needed to drill the pads would have an additional impact to the areas soils. In the long term, if economical quantities of oil and gas are found, additional wells can be expected to be drilled. This could add a large amount of disturbance that could have a larger impact on soils in the future.

Paleontologic Resources: Adverse significant impacts to paleontological resources can be reduced to a negligible level through mitigation of ground disturbing activities. It is possible that the proposed project would have the beneficial impact that ground disturbance activities might result in the discovery of important fossil resources.

CHAPTER 4 - CONSULTATION AND COORDINATION

4.1 LIST OF PREPARERS AND PARTICIPANTS

Please see Interdisciplinary Team Review list for BLM Participants

4.2 TRIBES, INDIVIDUALS, ORGANIZATIONS, OR AGENCIES CONSULTED

Native American Tribes were consulted at the lease stage.

CHAPTER 5 - REFERENCES

Bureau of Land Management. 1986. Northeast Resource Area Management Plan and Record of Decision. Lakewood, Colorado.

Bureau of Land Management. 1991. Colorado Oil and Gas Leasing Environmental Impact Statement. Lakewood, Colorado.

Bureau of Land Management. 2008 H-1790-1 National Environmental Policy Handbook. Washington, D.C.

Lewandowski, Brian, Wobbekind, Richard. July 2013. *Assessmant of Oil and Gas Industry, 2012 Industry Economic and Fiscal Contributions in Colorado*. Business Research Division, Leeds School of Business, University of Colorado Boulder.

Finding Of No Significant Impact (FONSI)

DOI-BLM-CO-200-2013-0094 EA

Based on review of the EA and the supporting documents, I have determined that the project is not a major federal action and will not have a significant effect on the quality of the human environment, individually or cumulatively with other actions in the general area. No environmental effects from any alternative assessed or evaluated meet the definition of significance in context or intensity, as defined by 43 CFR 1508.27. Therefore, an environmental impact statement is not required. This finding is based on the context and intensity of the project as described below:

RATIONALE:

Context: The BLM has received 7 Application Permits to Drill (APDs), proposing the construction two well pads with associated access roads, and the drilling of 7 horizontal oil wells on private surface estates/over private mineral estates, in order to develop private and federal minerals (fee/fee/fed) in Weld County approximately 6 miles east of Longmont, Colorado. The federal mineral estate is leased and subject to oil and gas development.

The general area description would be defined as cultivated, irrigated cropland located near the I-25 corridor, North of the Denver-Metro area, in the Wattenberg Field. Much of this area is used for livestock and crop production and oil and gas development. There are highways and county roads near the project area. Access to the pads is limited to private or petroleum field roads, over private surface. There are no public lands, or public access to the project.

Extensive oil and gas development has occurred in the area, mostly on private (fee) surface and private (fee) mineral estate.

Intensity:

I have considered the potential intensity/severity of the impacts anticipated from the proposed Grant Salisbury and File APD projects. Project decision relative to each of the areas suggested for consideration by the CEQ. With regard to each:

Impacts that may be beneficial and adverse:

There would be minor impacts to air quality from the proposed wells. Most of this would occur during the drilling phase. Potential impacts might occur to ground water; however such impacts should not occur if strict drilling requirements are followed. Other minor impacts might occur to wildlife and migratory birds but would be mitigated through the use of timing stipulations. Positive impacts include benefits in royalties and revenue generated to the federal government from productive wells. Other indirect effects could include effects due to overall employment opportunities related to the oil and gas and service support industry in the region as well as the economic benefits to state and county governments related to royalty payments and severance taxes. Other beneficial impacts

from the action would be the potential for productive wells being created that would add, albeit in a small way to national energy independence.

Public health and safety:

The proposed action will have a temporary negative impact to air quality through the generation of fugitive dust during the construction phase. Utilization of the road, surface disturbance, and construction activities such as drilling, hydraulic fracturing, well completion, and equipment installation will all impact air quality through the generation of dust related to travel, transport, and general construction. This phase will also produce short term emissions of criteria, hazardous, and greenhouse gas pollutants from vehicle and construction equipment exhausts. Once construction is complete the daily activities at the site will be reduced to operational and maintenance checks which may be as frequent as a daily visit. Emissions will result from vehicle exhausts from the maintenance and process technician visits. The pad can be expected to produce fugitive emissions of well gas, which contains mostly methane and a minor fraction of volatile organic compounds. Fugitive emissions may also result from pressure relief valves and working and breathing losses from any tanks located at the site, as well as any flanges, seals, valves, other infrastructure connections used at the site. Liquid product load-out operations will also generate fugitive emissions of VOCs and vehicular emissions. If the operator is unable to sell any produced gas from the well, then gas flaring will also produce emissions of criteria, HAP, and GHG emissions.

Unique characteristics of the geographic area:

The EA evaluated the area of the proposed action and determined that no unique geographic characteristics such as: wild and scenic rivers, prime or unique farmlands, Areas of Critical Environmental Concern, designated wilderness areas, wilderness study areas or Lands with Wilderness Characteristics; were present.

Degree to which effects are likely to be highly controversial:

The potential for controversy associated with the effects of the proposed action is low. There is no disagreement or controversy among ID team members or reviewers over the nature of the effects on the resource values on public land by the proposed action.

Degree to which effects are highly uncertain or involve unique or unknown risks:

The drilling of oil and gas wells has occurred historically over the past century and although the potential risks involved can be controversial, they are neither unique nor unknown. There is low potential of unknown or unique risks associated with this project due to numerous other well locations having been successfully drilled in this area of Weld County.

Consideration of whether the action may establish a precedent for future actions with significant impacts:

The proposed APDs will be limited to standard construction procedures associated with pad/road construction and drilling in Weld County and have occurred historically on split and private mineral estate. There are no aspects of the current proposal that are precedent setting.

Consideration of whether the action is related to other actions with cumulatively significant impacts:

The action is a continuation of oil and gas activities that have historically occurred in the area. Continued oil and gas activity in the area will have minor but additive impacts to air and the production greenhouse gas emissions. The project area having been subject to historic drilling activity will continue to experience gradual depletion of the recoverable oil and gas products. Although past cattle grazing had contributed to cumulative impacts, there have been no other recent activities besides oil and gas that has contributed to cumulative impacts.

Scientific, cultural or historical resources, including those listed in or eligible for listing in the National Register of Historic Places:

Although four historic properties were found (5WL3146.3, 5WL3146.4, 5WL3146.5, and 5WL5461.2), the undertakings were redesigned to avoid the sites, and there will be no adverse effect on them

Threatened and endangered species and their critical habitat:

There are no known populations of T&E species in the action area.

Any effects that threaten a violation of Federal, State or local law or requirements imposed for the protection of the environment: The proposed action conforms with the provisions of NEPA (U.S.C. 4321-4346) and FLPMA (43 U.S.C. 1701 et seq.) and is compliant with the Clean Water Act and The Clean Air Act, the National Historic Preservation Act, Migratory Bird Treaty Act (MBTA) and the Endangered Species Act.

NAME OF PREPARER: Aaron Richter

SUPERVISORY REVIEW: /s/ Jay Raiford

NAME OF ENVIRONMENTAL COORDINATOR: /s/ Martin Weimer

DATE: 3/14/14

SIGNATURE OF AUTHORIZED OFFICIAL: /s/ Melissa k. S. Garcia
for Keith E. Berger, Field Manager

DATE SIGNED: 3/14/14

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
ROYAL GORGE FIELD OFFICE

DECISION RECORD

Project Name

DOI-BLM-CO-F02-2014-016-EA

DECISION: It is my decision to authorize the Proposed Action as described in the attached EA. The proposed action is to [construction two well pads, with associated access roads, and the drilling of two horizontal oil wells on private surface estates/over private mineral estates, in order to develop private and federal minerals \(fee/fee/fed\)](#). Access to the proposed Razor I, J, L project would be gained by traveling on existing state, county and petroleum field roads.

The proposed project [is located in Weld County approximately 6 miles southeast of Longmont, Colorado. The federal mineral estate within the project boundary is leased and subject to oil and gas development.](#)

The proposed action was analyzed in the Environmental Assessment (EA) DOI-BLM-CO-F02-2014-016 EA and a Finding of No Significant Impact was reached and an EIS will not be prepared.

RATIONALE: This APD will develop oil and gas resources on federal minerals COC 53941 and COC 30024 consistent with existing Federal lease rights provided for in the Mineral Leasing Act of 1920, as amended. Extensive oil and gas development has occurred throughout the project area, mostly on private mineral estate.

The project area currently has a high degree of alteration in the form of agricultural fields, roads, houses, and oil and gas production. The addition of the infrastructure needed to construct and drill the 7 proposed wells would have mostly temporary and overall minor impacts on resources present in the project area.

MITIGATION MEASURES\MONITORING:

Protective / Mitigation Measures: Multiple near-field modeling assessments performed by the BLM Colorado for Colorado-based oil and gas air quality assessments indicate that water (or product with equivalent dust control) application to unpaved surfaces is necessary during the oil and gas development / construction phase to achieve air quality compliance even though construction phases last just a few months. The short-term particulate matter air quality standards do not allow for many exceedances per year and therefore could be exceeded multiple times with only a couple of weeks of non-emissions controlled construction activities.

As shown in Figure 3-1, the project is located within the 8-hr ozone NAA boundary. Air quality monitors are used to indicate whether an area is in compliance with air quality standards and the EPA is currently re-evaluating the 8-hr ozone standard and is possibly

going to reduce the standard in the near future. For these reasons, it is appropriate to suggest that the applicant apply the oil and gas NSPS OOOO requirements (Table 3-4) to all activities regardless if the well is classified as oil or as gas (NSPS OOOO regulations currently apply to “natural gas” wells). These suggestions include the assumptions for the emissions inventory for this analysis which account for green completions, 95% VOC controls on all storage tanks and low-bleed pneumatic devices. It is also suggested that no natural gas is vented to the atmosphere during liquid truck loading, well blow-downs or maintenance or re-working of a well, but rather captured or combusted using a flare or combustion device. These actions would greatly reduce the overall project related ozone precursor VOC and HAPs emissions.

It is anticipated that the operator would apply for either an APCD air permit for the site as a whole, or cover individual equipment under one of Colorado’s general permits for oil and gas operations. The state as the regulatory authority for oil and gas actions requires controls of emissions and standards for compliance that the operator will be subject to. It is expected that the operator will comply with the requirements and make every effort to minimize emissions through good engineering and operating practices to the maximum extent practical.

The following BLM requirements will apply:

- COA – comply with all applicable State and Federal Standards.
- COA - all drill rigs, fracing and completion related engines will be required to meet EPA Non-Road Tier II Emissions Standards (or cleaner) for all well development operations.
- COA – applicant will apply water or dust-suppressant to unpaved surfaces likely to be disturbed (roads and well pad) to achieve at least 50% dust control during construction / well development phase.
- COA - green completion will be implemented for all well developments.
- COA - VOC emissions controls achieving at least 95% control efficiency will be applied to all storage tanks.
- COA – the applicant is required to operate low-bleed pneumatic devices only for the project wells.
- COA – the applicant will control emissions during liquid truck loading.
- The applicant will minimize natural gas venting during well blow downs or maintenance or re-working of a project well.

Geology and Mineral Resources: Onshore Order #2 requires that the proposed casing and cementing programs shall be conducted as approved to protect and/or isolate all usable water zones and prospective mineral zones. At the APD stage, geologic and engineering reviews will be completed to ensure that cementing and casing programs are adequate to protect all downhole resources. Known water bearing zones in the APD area are protected by drilling requirements and, with proper practices, contamination of ground water resources is highly unlikely. Casing along with cement would be extended well beyond fresh-water zones to ensure that drilling fluids remain within the well bore and do not enter groundwater.

Invasive Plants: Equipment used to implement the proposed action should be washed prior to entering the project area to remove any plant materials, soil, or grease. Areas disturbed by project implementation will be monitored for the presence of weeds on the Colorado State Noxious Weed list. Identified noxious weeds will be treated. Monitoring is required for the life of the project and for three years following completion and/or abandonment of the wells and elimination of identified Colorado State Noxious Weeds list A and B species.

Migratory Birds: To be in compliance with the Migratory Bird Treaty Act (MBTA) and the Memorandum of Understanding between BLM and USFWS required by Executive Order 13186, BLM must avoid actions, where possible, that result in a “take” of migratory birds. Under the MBTA, “take” means to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in such conduct. All mortality or injury to species protected by the MBTA shall be reported immediately to the BLM project lead and to the USFWS representative.

Pursuant to BLM Instruction Memorandum 2008-050, to reduce impacts to Birds of Conservation Concern (BCC), no habitat disturbance (removal of vegetation such as timber, brush, or grass) is allowed during the periods of May 15 - July 15, during the breeding and brood rearing season for most Colorado migratory birds. An exception to this TL will be granted if nesting surveys conducted no more than one week prior to surface-disturbing activities indicate no nesting within 30 meters (100 feet) of the area to be disturbed. Surveys shall be conducted by a qualified breeding bird surveyor between sunrise and 10:00 a.m. under favorable conditions. This provision does not apply to ongoing construction, drilling, or completion activities that are initiated prior to May 15 and continue into the 60-day period.

Any secondary containment system will be covered in a manner to prevent access by migratory birds. The operator will construct, modify, equip, and maintain all open-vent exhaust stacks on production equipment to prevent birds and bats from entering, and to discourage perching, roosting, and nesting. Production equipment includes, but may not be limited to, tanks, heater-treaters, separators, dehydrators, flare stacks, and in-line units. Any action that may result in a “take” of individual migratory birds or nests that are protected by MBTA will not be allowed.

Paleontological Resources: In order to prevent potential impacts to paleontologic resources, a stipulation will be attached to the APD that directs the holder to notify the BLM RGFO immediately if any vertebrate fossils or their traces are discovered during operations. Operations may continue as long as the fossil specimen would not be damaged or destroyed by the activity. Within 5 working days of notification, the BLM RGFO shall evaluate or have evaluated such discoveries and shall notify the operator what action shall be taken with respect to such discoveries. If any significant fossils are found, development of a research design and data recovery may also be recommended before the project proceeds. Any fossils recovered on private land belong to the private landowner; however, the BLM recommends the use of a federally approved repository for storage of any fossils recovered in these efforts.

In many instances where the surface estate is not owned by the federal government, the mineral estate is, and is administered by the BLM. Paleontological resources are considered to be part of the surface estate. If the BLM is going to approve an action involving the mineral estate that may affect the paleontological resources, the action should be conditioned with appropriate paleontological mitigation recommendations to protect the interests of the surface owner. The

surface owner may elect to waive these recommendations; such a waiver must be documented in the casefile.

Wastes, Hazardous or Solid: The following mitigation will assist in reducing potential spills resulting in groundwater and/or soil contamination:

- All Above Ground Storage Tanks will need to have secondary containment and constructed in accordance with standard industry practices or an associated Spill Prevention Control and Countermeasures plan in accordance with State regulations (if applicable).
- If drums are used, secondary containment constructed in accordance with standard industry practices or governing regulations is required. Storage and labeling of drums should be in accordance with recommendations on associated MSDS sheets, to account for chemical characteristics and compatibility.
- Appropriate level of spill kits need to be onsite and in vehicles.
- All spill reporting needs to follow the reporting requirements outlined in NTL-3A.
- No treatment or disposal of wastes on site is allowed on Federal Lands.
- All concrete washout water needs to be contained and properly disposed of at a permitted offsite disposal facility.
- If pits are utilized they need to be lined to mitigate leaching of liquids to the subsurface, as necessary. State and/or Federal regulations may apply to pit construction and removal.

PROTEST/APPEALS: This decision shall take effect immediately upon the date it is signed by the Authorized Officer, and shall remain in effect while any appeal is pending unless the Interior Board of Land Appeals issues a stay (43 CFR 2801.10(b)). Any appeal of this decision must follow the procedures set forth in 43 CFR Part 4. Within 30 days of the decision, a notice of appeal must be filed in the office of the Authorized Officer at the Royal Gorge Field Office, 3028 E. Main, Cañon City, Colorado, 81212. If a statement of reasons for the appeal is not included with the notice, it must be filed with the Interior Board of Land Appeals, Office of Hearings and Appeals, U.S. Department of the Interior, 801 North Quincy St., Suite 300, Arlington, VA 22203 within 30 days after the notice of appeal is filed with the Authorized Officer.

SIGNATURE OF AUTHORIZED OFFICIAL:

/s/ Melissa k. S. Garcia
for Keith E. Berger, Field Manager

| **DATE SIGNED:** 3/14/14